Solar Heating Catalogue No. 3

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Solar Heating Catalogue No. 3

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This catalogue is only a listing of services and products available and is not intended to represent approval or endorsement by the Canadian Federal Government.

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Introduction

Purpose

The purpose of ***Solar Heating Catalogue No. 3*** is to identify the individuals, companies, and organizations which make up the solar heating industry in Canada. In an attempt to reach all those involved, announcements about the ***Catalogue*** were put in the media and questionnaires were sent to everyone listed in the earlier ***Solar Heating Catalogues***.

The information presented here is based on those questionnaires as filled out by the designers, manufacturers, or distributors, and no claims have been verified or corrected. A number of the questionnaires were incomplete or illegible and so could not be listed. Before ordering any services or equipment, you should write to the designer, manufacturer, or distributor to check the information given here.

In such a rapidly changing field as solar heating, keeping information current is a major problem. Companies may move or merge or go out of business, products may no longer be available or may be replaced with newer versions. Information in ***Solar Heating Catalogue No. 3*** was current as of the autumn of 1981. If you wish to update any of the information given in this ***Catalogue***, or if your company offers a solar-related product or service that you think should be listed in a future version, please complete one of the forms included at the back of this edition. Contact your regional Conservation and Renewable Energy Office (CREO) of Energy, Mines and Resources if you want any further information on solar energy. CREO addresses are given in the Appendix.

Inclusion of a product in this catalogue does not indicate any form of approval, endorsement, or responsibility by the Federal Government. It is up to the consumer to assess the effectiveness and quality of the different products and services listed in this catalogue.

Organization

Solar Heating Catalogue No. 3 is divided into four major sections: **Introduction**, **Understanding Solar Technology**, **Directory**, and **Product Guide**.

The **Introduction** describes different kinds of solar heating, explains how to buy solar equipment, and discusses the types of solar hardware now available on the Canadian market.

Understanding Solar Technology provides a brief description of the different product types listed in the ***Catalogue***, and uses the same numbering system to allow cross-checking with information presented in the **Product Guide** section.

The **Directory** is a listing of the individuals and organizations involved in the solar field, including manufacturers, designers, builders, and installers. The listings are by province, although many organizations and companies also work on a national or regional basis. An Index is provided at the beginning of the **Directory** section to help in finding any organization or company if the name, but not the province, is known. Included are only those organizations which returned a completed questionnaire, and included a reference to a completed project or offered other demonstrated experience.

The **Product Guide** is an inventory of solar systems, components, parts, and materials manufactured or marketed in Canada. To be included in the ***Catalogue***, products had to be made in Canada with a minimum of 51% of direct costs originating here. Imported products have been included provided they have already been used on Canadian projects as well as being available in Canada from a Canadian sales office. In certain cases these restrictions were waived for highly specialized products where no comparable product is available in Canada; for example, solar access measuring devices or computer programs.

Products are grouped into four main sections: 1) systems, 2) components, 3) parts and materials, and 4) solar design aids.

The first section describes systems such as active space heating systems, domestic hot water heating (DHW) systems, swimming pool heating, and solar greenhouses. The description includes references to the components and parts used in the system. Information on those components and parts can then be located by referring to the later sections.

The second section describes the components used in solar heating systems, such as different types of collectors, handling units, and storage tanks.

The third section lists all the parts and materials that go into solar systems and components. It lists such items as glazings, absorber coatings, gaskets, insulation, pumps, controllers, and monitoring devices.

The fourth section describes solar design aids, such as computer and calculator programs, computer services, and devices used to measure solar access.

Solar Product Data File

A publication related to the ***Solar Heating Catalogue No. 3*** is the ***Solar Product Data File*** which is published by the Canadian Solar Industries Association. The ***Data File*** is a collection of specification Data Sheets which contain in-depth technical and performance information for selected solar collector and pre-packaged solar domestic hot water (DHW) heating systems. It is intended for use by engineers and others who specify or design solar installations. The ***Solar Product Data File*** is periodically updated as new products become available and as existing products are retested or redesigned. The ***Data File*** only lists solar collectors and DHW packages that are manufactured in Canada, that have been tested by an independent agency such as the National Solar Test Facility in Mississauga, Ontario, and that have been approved by Public Works Canada for purchase under Federal Government programs.

For products which are included in the ***Data File***, a cross-reference by Data Sheet number is given in the Product Guide section.

Federal Government Programs

In 1979 the Federal Government instituted two programs to help build the fledgling Canadian solar industry. The first was PASEM, a Program to Assist Solar Equipment Manufacturers. The purpose of that program was to help Canadian solar manufacturers improve their products, expand their production capabilities, and conduct much-needed research and development. By mid-1981, the PASEM program had provided over $3 million to ten Canadian solar companies to help develop the supply of solar equipment. Over 20 new products have resulted from this strategy.

The second program is PUSH, Purchase and Use of Solar Heating. Under this program the government is helping industrial development by creating a demand for the solar equipment generated under PASEM. By 1983, about $35 million had been spent on 800 projects putting solar equipment on Federal Government buildings from coast to coast. Projects include swimming pool heating systems, hot water for showers in federal penitentiaries, plane washing facilities for Air Canada, rail-car washing facilities for Canadian National, and domestic hot water heating systems in small post offices throughout the country. This program is being phased down and will end by March, 1985.

On July 7, 1983, the federal government announced a $79 million program to support the development of active solar energy in Canada. This five-year program is intended to provide support to the solar energy industry, enabling it to produce more cost-effective systems. This new initiative will continue to provide support for research and development activities coordinated by the National Research Council. As well, Energy, Mines and Resources will manage demonstration programs in the commercial/industrial and residential sectors. These demonstration programs will help identify new markets and applications as well as provide valuable cost/performance information.

PUSH Installation Granville Island, B.C.

EMR Demonstration Project in Brampton, Ontario

The Canada Oil Substitution Program (COSP) provides grants of up to $800 to convert from oil to solar and other forms of heating. You can get a grant for installing pool, DHW, or active solar space heating systems. Contact your local Conservation and Renewable Energy Office (CREO) of Energy, Mines and Resources for more information. Addresses for these CREO contacts are listed in the Appendix at the back of the book.

Solar Heating Economics

The concept of solar heating has captured the imagination of many Canadians during the last few years. Hundreds of people across the country have built solar houses or have retrofitted existing homes with solar equipment, and hundreds more are busy making plans to do so. A variety of churches, commercial, industrial, governmental, and other organizations are already using solar heating or are studying proposals to do so. By now solar technology is well proven and, in the appropriate application, will result in cost savings to the consumer.

The principal factor for most people in assessing solar heating is the amount of energy supplied by the system in relation to the money invested. This return on investment is sometimes called the "BTU per buck" criterion.

One way of figuring out solar cost efficiency is to compare it with conventional energy systems such as gas, oil and electricity to see how well it measures up. To do this, the systems must be compared in terms of life-cycle costs, the sum of all the expenses of a system throughout its lifetime. You have to bear in mind that initial costs for solar systems are high, but operating costs are low because the sun's energy is free. Conventional energy systems do not usually require such a large initial expenditure but have much higher operating costs which inevitably increase as fuel prices rise.

Without attempting a sophisticated analysis, the following rough figures indicate the relative cost effectiveness of the different applications of solar space, domestic hot water, and pool heating systems.

Space Heating

For an active solar space heating system, the cost can vary between $5,000 for a do-it-yourself system to $15,000 or more for a fully installed unit. The system can provide anywhere between 25% and 75% of heating demand, indicating that the resulting energy savings can vary significantly.

For certain specialized applications, such as preheating make-up air for buildings which require high ventilation rates (e.g., bus garages or paint shops), active space heating systems can be cost effective. In general, however, the economics of active solar space heating systems are not attractive at the present time; a much better investment is the combined package of energy conservation and passive solar.

The Saskatchewan Conservation House is a good example of the kind of energy-efficient housing that is becoming more and more common across Canada. These super-insulated houses are typically insulated to RSI 7.9/R 45 in the walls and RSI 10.6/R 60 in the ceilings, are air-tight, and may be equipped with various heating recycling systems. Insulated window shutters and an energy-saving ventilation system such as an air-to-air heat exchanger, may also be installed. By using these heat-saving techniques, the usual rate of energy consumption can be reduced by 80% to 90%, with the result that these houses were heated in 1981 for $100 to $200 per year.

By simply placing the majority of windows on the south side, there is a significant direct heat gain through passive solar collection amounting to about 45% of the total heat load; recycled heat and energy from the occupants and domestic appliances supplies almost another 40%. The back-up heating system for these super-insulated air-tight houses, therefore, has to supply only about 15% of the total heating load.

A number of builders and developers are now producing these energy-efficient houses. It has been estimated that the cost of a combined package of super-insulation and simple passive design requires an additional capital investment of from $3,000 to $8,000 per house and averages about $5,000.

Saskatchewan Conservation House

Domestic Hot Water

The capital cost of a domestic hot water system is around $2,500 to $3,500 for a professionally installed package. The system can provide between 40% and 70% of total demands, so the solar energy savings can be in the region of $100 to $300 per year. Do-it-yourself seasonal water heaters that operate only eight or nine months per year are much cheaper, depending on design, materials, and how much of the work you can do yourself. Solar domestic hot water heating is rapidly becoming economically practical, especially if you have a high hot water load and you are located in an area where the price of traditional energy sources (electricity, oil, or gas) is high.

Pre-packaged, professionally installed solar DHW systems are now available throughout most of Canada and may become as common as air conditioners or dehumidifiers.

Swimming Pool Heating

The capital cost of an active solar pool heating system is relatively low, about $2,000 to $3,000 for a typical back-yard pool with a suitable roof nearby for the solar collectors. For most installations, swimming pool heating represents the most cost effective application of solar heating available today.

Because the costs of heating a pool with conventional fuels are so high — anywhere from $500 to $1,500 per season — the payback period for a complete solar pool system professionally installed can be as short as three years, and is usually less than five years. If you currently heat your pool with fuel oil and convert to active solar, you are eligible for a grant under the government's Canada Oil Substitution Program (COSP). Contact your local CREO office for details; addresses are listed in the Appendix.

Contacting the Solar Industry

Once you decide to become involved with solar, you have a wide choice of contacts. The decision on what approach to take depends largely on what kinds of solar system you want. The **Directory** is subdivided to help you make that choice, by listing information by Design, Equipment Distribution, Information and Education, Installation, Manufacturing, and Research and Development.

If you want a solar house, your best bet will be to contact an engineer, architect, or other solar designer, who can prepare plans and specifications for the project and help you choose the equipment. On the basis of these plans, a contract for the work can be tendered or negotiated with an installation firm. This approach has several advantages, including the fact that you get independent advice and judgement by a professional designer.

You may prefer to hire a firm in the solar business, a company which is capable of designing, supplying, and installing the entire system. The advantage here is that only one organization is involved and there is no uncertainty over who is responsible for getting things done and seeing that they work properly. It is up to you to check that the equipment is what you really need, that it is worth buying, and that the firm has a record of doing good work. You should also be sure that your contract is clear and concise about all aspects of this work.

If you have sufficient knowledge to take control of the project yourself, you may only need to hire specialized expertise as required. You might, for example, be able to select the appropriate equipment yourself and only require a professional installer to do the actual work. You might also be able to realize significant savings by installing the system yourself, but you should be aware that solar installations require a broad range of skills, and one small error can lead to costly and dramatic failures. If you choose to hire a professional installer, you should check that he has experience in heating, plumbing, or engineering and has received formal training, such as the Canadian Solar Industries Association's Solar Installer's course. Check whether he is approved by the manufacturer of the solar equipment — if not, the warranty may be void.

Be sure you understand how the warranty works. Find out what is covered and who covers it. The solar industry is still relatively new and during the period when regulations and controls are being developed, the consumer is not well protected. The situation, however, is changing. Standards are being prepared and an industry warranty program is under development. When these new initiatives are complete, the consumer will be able to go out with confidence and purchase solar equipment knowing that the equipment will be sound and the warranty will be honoured.

The Canadian solar industry is well on its way to becoming world-class, and one of the best. Already our solar products are penetrating markets in the USA, Africa, the Caribbean and the Middle East. If there is to be a successful Canadian solar industry, you — the consumer — have to play a part. When you buy solar, be careful, be selective, and buy Canadian!

Understanding Solar Technology

This section contains descriptions of different kinds of solar hardware, organized in the same hierarchical manner as the information in the **Product Guide**. The same numbering system is also used for ease in cross-referencing. First to be described are the systems — space heating systems, domestic hot water heating systems, pool heating, and solar greenhouses.

Then come descriptions of the components of those systems — collectors and their support racks, thermal storage units, handling units, heat exchangers, insulated windows and shutters, and photovoltaic panels. The next group describes the parts and materials that are used within the components — collector glazings, absorbers and coatings, gaskets, insulation, pumps, monitors and controls, phase-change materials, and so on. The last section describes briefly the computer programs available to assist in the design of both active and passive solar heating systems as well as solar access measurement devices.

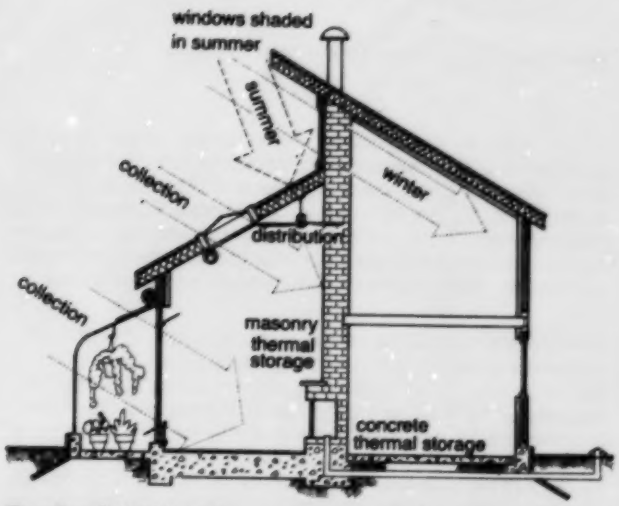
As you read these descriptions, you can flip to the corresponding section in the **Product Guide** to find out about the actual products that are available.

Systems are also described as being either liquid or air systems, depending on which fluid is used to gather and distribute the heat. For the most part, the circulation and distribution components of liquid solar heating systems are assembled from standard plumbing parts that can be purchased from most hardware or plumbing supply stores. Such standard items as piping or specific types of valves, not specifically solar, are not included in this catalogue; it is recommended that you contact the nearest plumbing supplier to see what products are available locally.

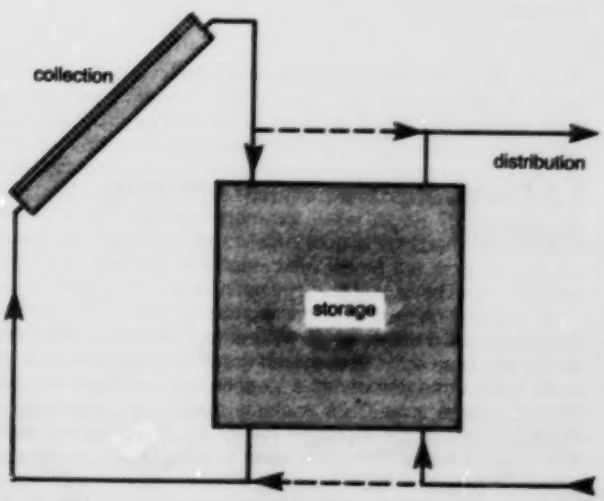
For air solar heating systems, many of the specialized parts required for the circulation and distribution system are standard items in the heating, ventilating, and air conditioning (HVAC) industry. This applies to such items as ducting, back-flow dampers, motorized dampers, and variable-speed blowers. These items are not included in the catalogue. Check with your nearest HVAC supplier to see what products are available locally.

1. Systems

Solar space heating systems are divided into two categories, active systems and passive systems. With passive systems the building itself is designed to collect, store, and distribute the radiant energy from the sun. With active systems, separate components are used to collect, store, and distribute solar energy, and a pump or blower is required to actively transfer the heat from collectors to storage and from storage to the building.



Passive Solar House



Active Solar System

1.1 Active Space Heating Systems

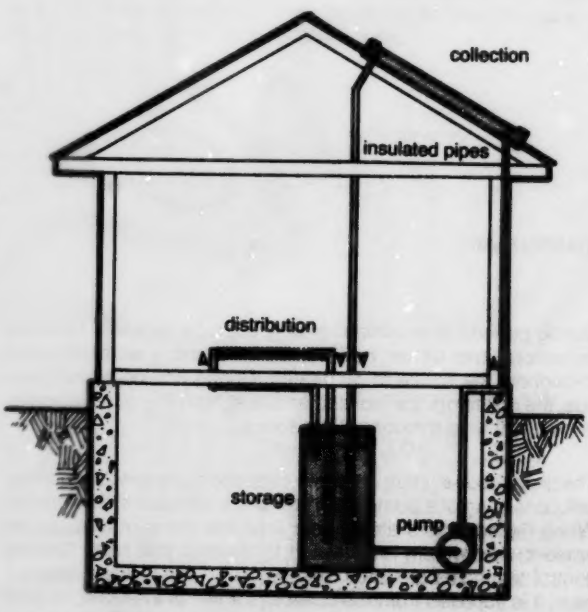
Collection

The key component of any active system is the solar collector which traps the sun's radiant energy and transforms it into usable heat. Various types of collectors are used in solar energy conversion, depending on the application, but they all work on the same principle — sunlight is absorbed by a blackened surface and is converted to heat which is carried off by water, air, or some other heat transfer medium.

Active space heating systems commonly use flat plate collectors which capture solar radiation on a flat absorber plate and rely on the "greenhouse effect" to trap most of the heat behind some form of glazing. Depending on the heat transfer fluid used, flat plate collectors are classified as either liquid or air collectors and both types are suitable for year-round medium temperature applications.

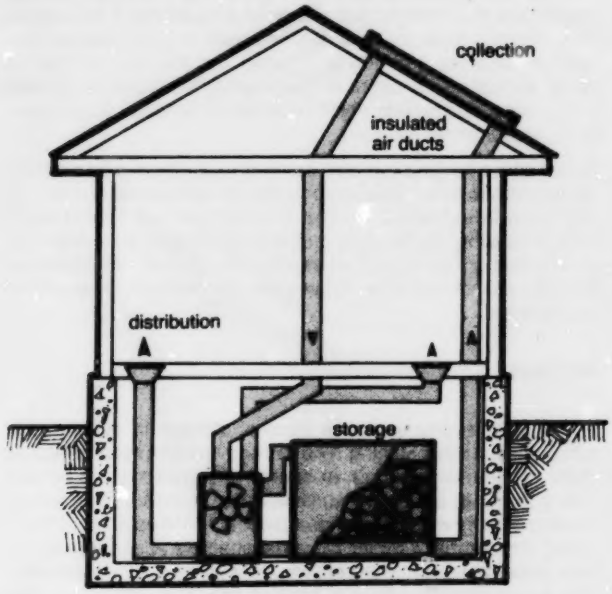
Storage

Active solar systems require thermal storage to provide heat when the sun is not shining. The storage medium must be able to store substantial amounts of energy in a reasonably compact space for up to about five sunless days. A seasonal or annual storage system would seem ideal, saving heat all summer for use during the depths of winter, but most attempts at annual storage have been prohibitively expensive. For systems with limited storage, some form of auxiliary or back-up heat is required to supplement the heat collected and stored by the active solar system.



Active Liquid Space Heating System

For air systems, rocks, crushed gravel, or sealed containers of phase-change salts are usually selected for the heat storage material because no special heat exchangers are needed to transfer the heat from air to storage. For liquid systems, water is usually used for storage because it is inexpensive and readily available.



Active Air Space Heating System

Distribution

During periods of sunshine, energy must be removed from the collectors and either transferred to storage or distributed throughout the space to be heated. During non-collection periods, the collectors are isolated and heat from the storage needs to be distributed throughout the space.

The distribution system is usually controlled by a special handling unit consisting of a pump or blower and a differential thermostat. When the collectors are warmer than the storage by a pre-set amount, the system is activated to transfer that heat. Several control strategies are used, but typically if the building requires heat, it is supplied from the collectors if any is available, or from storage if any heat remains; otherwise it is supplied by the back-up heating systems.

Pre-packaged Window Units

A number of "mini" solar units are available which are designed to be mounted in south-facing windows. Although these pre-packaged systems do collect and distribute solar heat, they rely on the house itself to provide thermal storage and they reduce passive gains through the south-facing windows by the amount of window they occupy with their installation and distribution system. You are advised to be particularly careful before buying one of these products as some manufacturers of these units make exaggerated claims for their performance. No solar system can provide significant amounts of heat if the area of the collecting surface is insufficient for the size of the building to be heated.

Combined Active Solar/Heat Pump Systems

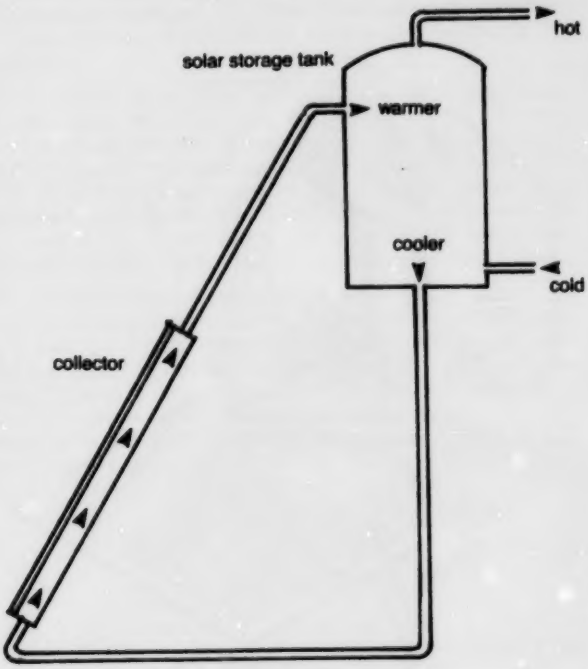
A heat pump is an electrically driven device, similar to an air conditioner or a refrigerator, which withdraws heat from one side, leaving it cooler, and "pumps" that heat to the other side, making it warmer. Usually the heat pump can operate in reverse, thus providing heat during the winter and air-conditioning during the summer. A heat pump used in conjunction with an active solar system can result in increased efficiencies for both systems.

A heat pump can extract heat from storage even when the storage temperature is too cool to be distributed directly to the building. In this way, the useful temperature range and the heat capacity of the storage are increased. If there is sufficient low-temperature storage, the heat pump may be able to continue working at high efficiencies and may represent a more economical form of back-up heat than conventional methods. In addition, by further reducing the storage temperature, the heat pump lowers the temperature of the heat transfer fluid going to the solar collectors, which raises collection efficiencies and the amount of heat energy that can be captured. However, since heat pumps are not primarily solar systems, they have not been listed in this catalogue.

1.2 Domestic Hot Water Heating Systems

A solar domestic hot water (DHW) heating system operates in a similar way to an active space heating system and consists of the same basic three components — collection, storage, and distribution. Some solar DHW systems contain an electric resistance element in the storage tank for auxiliary heating, while others use a conventional hot water heating tank connected in series. This latter system uses the solar components as a pre-heat system to warm the incoming cold water before it goes to the conventional hot water tank. Solar water heating systems can rely on either natural or forced circulation.

Some systems use the thermosyphon principle to transfer heat from the collector directly to the storage. These naturally circulating **thermosyphon systems** operate on the principle that as fluids are heated they become less dense and rise and as they cool they become more dense and sink. By positioning the collectors below the level of the storage tank, the fluid heated by the sun rises up through the collector and piping and into the tank where it is replaced by the cooler fluid from the bottom of the tank, which in turn is heated and rises, creating a slow-moving circuit.



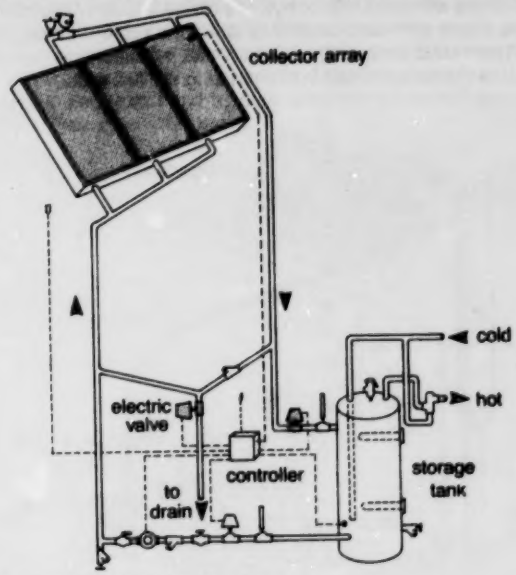
Thermosyphon System

Thermosyphon systems may require a check valve to prevent reverse flow at night which would cool the storage. If these thermosyphon systems are to be used during cold weather, they also need protection against freezing. This protection is usually provided by an antifreeze solution, which requires a copper coil or other heat exchanger in the storage tank to separate the collector antifreeze circuit from the domestic water supply. These systems usually use a pump in the collector loop to transport the heat to a lower point (usually the basement) where the storage tank is placed. The thermosyphon technique is then used by placing the tank above the heat exchanger in the system so that the "hot" pumped collector fluid warms the water in the heat exchanger and forces it to rise up to the storage tank.

Pumped systems are more common because the collectors can be above the storage and so are easily located on a roof with the storage tank below.

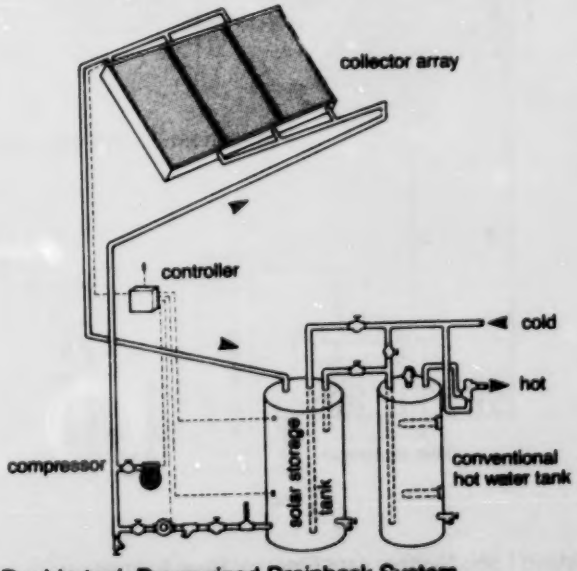
Non-thermosyphon pumped systems come in three basic designs: drain down, drain back and closed loop.

Drain down systems pump the water to be heated through the collectors and provide freeze protection by having an electric valve open, so that water in the collectors can be dumped down the drain. Drain down systems are not common in Canada as any malfunction of the electric valve leaves the water-filled collectors exposed to expensive damage if they freeze.



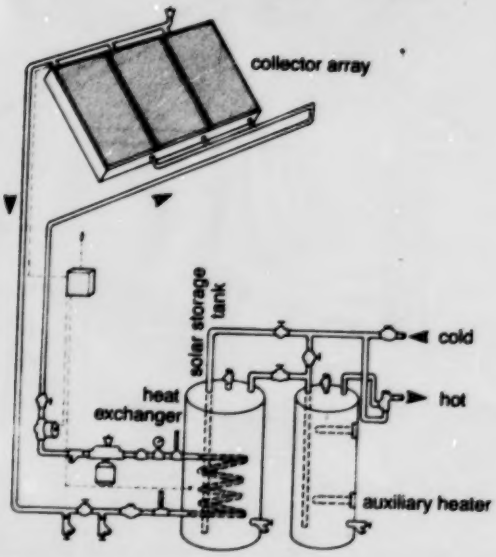
Single-tank Draindown System

Drain back systems also circulate water through the collectors. When the pump stops, air enters the collector array from a vent or from a compressor, and the water in the system automatically drains back to the storage tank. Some drain back systems circulate the domestic water through the collectors; others use treated water which is kept separate from the domestic water by using a simple heat exchanger in the storage tank.

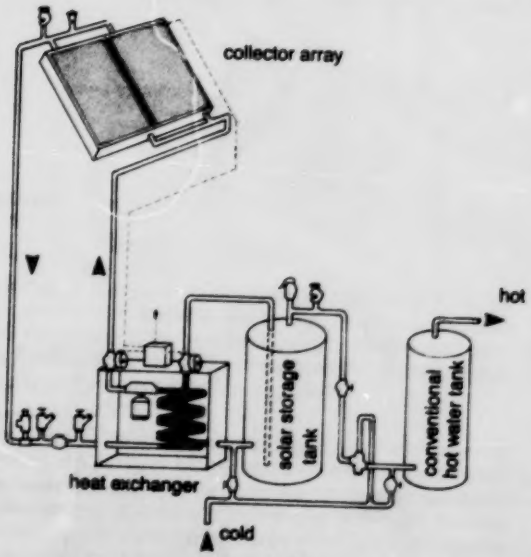


Double-tank Pressurized Drainback System

Closed loop systems provide freeze protection by pumping antifreeze through the collector array. The heated fluid from the collectors is pumped through a heat exchanger in the storage tank. Because of the danger of contaminating the domestic water supply with antifreeze from the closed loop, the heat exchanger must provide fail-safe protection. Some systems use non-toxic antifreeze solutions with a dye to provide visible leak detection, while those with toxic antifreeze solutions use both a dye and a double-walled heat exchanger so that any leakage can drain outside the tank without contaminating the hot water.



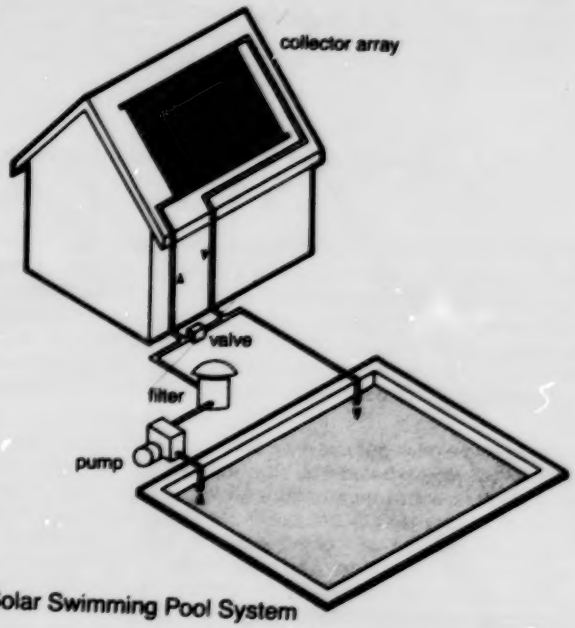
Closed Loop System with Internal Heat Exchanger



Closed Loop System with External Heat Exchanger

1.3 Swimming Pool Heating Systems

For most locations in Canada, a solar pool heating system can keep an outdoor pool comfortably warm throughout the swimming season. There is no need for a back-up heating source. Indoor pools also can be heated with solar systems, but because they are used year-round they require glazed and insulated flat plate collectors and operate in the same manner as a solar water heating system.



Solar Swimming Pool System

Solar pool systems are simpler than DHW systems as use can be made of the existing pool filtration and pumping system. A typical pool package includes an array of low-temperature solar collectors, an automatic electronic controller, and the necessary valves and piping.

The collector array is connected into the pool's plumbing lines after the filter. An electrically operated valve diverts the water flow through the collectors when temperature sensors tell the controller that sufficient solar energy is available to warm the pool water. When solar energy levels drop, the valve automatically opens and the water is drained from the collectors and piping. The flow then bypasses the collectors and continues in the normal manner from the filter, straight to the pool.

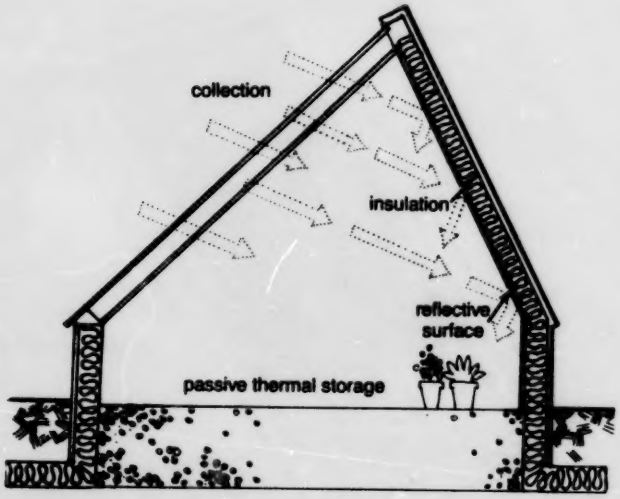
Pool collectors are either glazed or unglazed. Collector arrays are usually sized at 30% to 100% of the pool's surface area, the amount being determined by a combination of factors, such as whether the pool surface or collector receives any shade, whether or not an insulating pool cover is used, how warm you wish to keep your pool and for how long a season, the amount of sunshine and average wind speeds and air temperature in your area, as well as the tilt and orientation of the collector array. If glazed collectors are used a smaller panel area will usually supply the same amount of heat.

1.4 Solar Greenhouses

All greenhouses maximize the amount of light for growing plants, and use the solar energy entering through the south-facing glazing to provide part of the heat load. What makes solar greenhouses different is that design efforts are made to decrease the area of glazing on non-south walls, to reduce heat losses, and to increase the ability of the greenhouse to conserve the heat that is collected during periods of sunshine. Only greenhouses with one or more of these characteristics have been included in this ***Catalogue***.

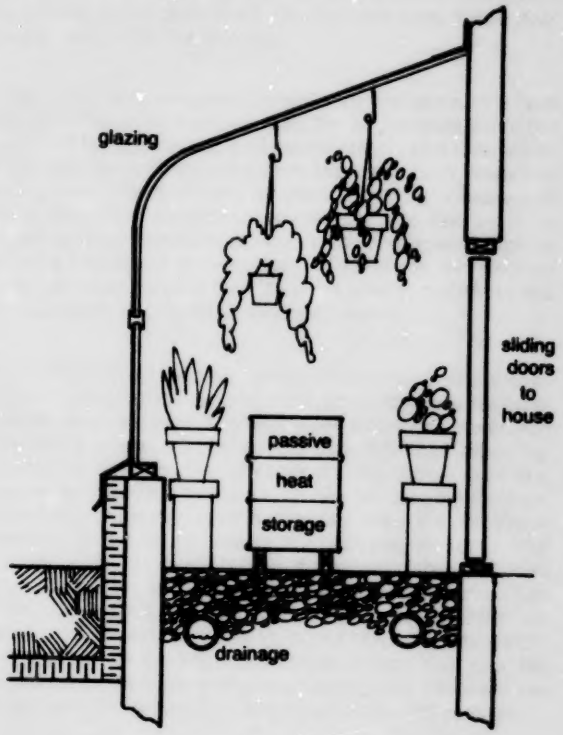
With a conventional greenhouse and little thermal storage capacity, most solar heat has to be wasted by dumping it outside, through opening vents to prevent over-heating the plants. Solar greenhouses are designed to save this excess heat, either directly by letting the sunshine fall on earth, rocks, water-filled containers, or on masonry floors and rear walls, or indirectly by blowing the heated air through rock storage beds, hollow concrete block walls, or around stacks of small water-filled bottles.

Solar greenhouses can also be designed to reduce heat losses by employing techniques such as double glazing, insulated curtains over the glazing, insulated foundations and floors, tightly sealed construction to minimize air leakage, and insulated north walls. Because solar greenhouses usually have less glazing area than conventional greenhouses, the inner surface of all non-glazed walls should be made highly reflective to increase the light levels reaching the plants.



Free-standing Solar Greenhouse

Solar greenhouses can be free-standing or attached. When they are attached to the south wall of an existing building they are particularly effective as they have less exterior wall area from which to lose heat and the surplus heat collected on sunny days can be used to heat the house. A well-designed attached solar greenhouse can pay for itself within a few years by providing vegetables year-round and by supplying the house with excess solar heat throughout the winter.



Attached Solar Greenhouse

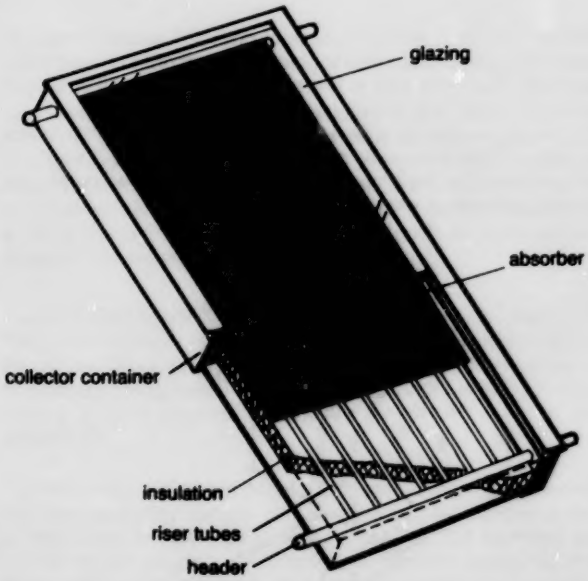
2. Components

This section contains descriptions of the components used in the solar systems already described in Section 1. More detailed descriptions of the parts and materials used within these components are given in Section 3.

2.1 Glazed Liquid Flat Plate Collectors

Glazed liquid flat plate collectors are ideally suited for medium-temperature solar heat collection, which is required for domestic or process hot water heating and for active space heating. These collectors consist of one or more layers of glazing over a blackened absorber plate with pipes or channels for the heat transfer liquid to flow through. The glazed absorber assembly is contained within an insulated metal container.

Collector glazing, either glass or plastic, is fastened to the front of the container by a mounting strip. Collectors may be double-glazed to reduce heat losses, although single-glazing is more common as it admits more light. The function of glazing is to allow the inward flow of short wave-length solar radiation while simultaneously reducing the outward flow of long wave-length reradiated thermal energy, a process known as the "greenhouse effect".



Glazed Liquid Flat Plate Collector

After solar radiation passes through the glazing, it strikes the surface of the absorber where it is converted into heat, a process which is enhanced by covering the surface of the absorber with a black coating. A selective coating is one which is highly efficient at absorbing solar radiation ("high absorptivity") but inefficient at reradiating thermal radiation ("low emissivity").

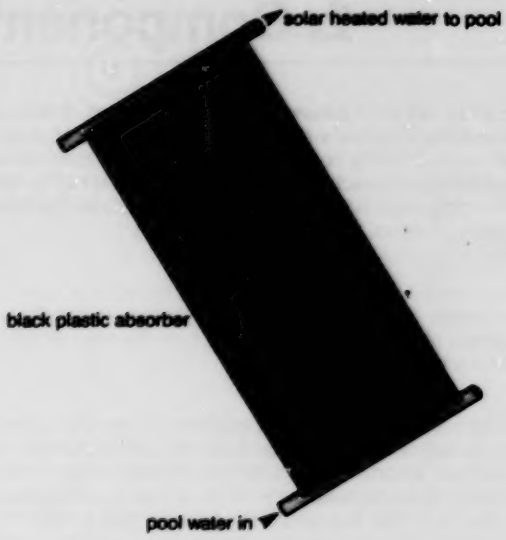
Heat is carried away from the absorber by water or some other heat transfer fluid. Copper pipes may be fastened to the absorber, or the absorber plate itself may form the front of fluid passageways integral to the absorber.

If a solar collector is exposed to bright sunshine without the heat being carried away by the solar fluid, the temperature inside the collector will continue to rise until the collector is able to reradiate its heat to the atmosphere at the same rate as it is being absorbed from the sun. This maximum temperature that a collector can reach is called the "stagnation temperature" and can occur, for example, during installation, during an electrical power failure, or if there is a breakdown in the system. All components of a collector and the heat transfer fluid must be able to withstand this stagnation temperature for an extended period.

Another kind of liquid flat plate collector is referred to as a phase-change or boiling/condensing collector, which operates in a manner similar to a heat pipe. The absorber's riser tubes are sealed and contain a refrigerant-type of heat exchange fluid. When the sun heats the collector, the fluid boils and the vapour rises to a condensation chamber at the top. A header carrying the heat transfer fluid passes through this chamber where the hot vapour condenses, giving up its heat to the heat transfer liquid. The condensed fluid then drains back to the bottom of the riser tubes to be reheated. This is a one-way process, since heat cannot flow from the header back into the collector during non-solar periods as there is no movement of boiling vapour into the condensation chamber. Because this effect eliminates reverse heat loss, the system does not need to be shut down during brief periods of low insolation and this reduces cycling of the pump and controls.

2.2 Unglazed Liquid Flat Plate Collectors

Flat plate collectors used for heating swimming pools do not have to be as elaborate as those used for space or domestic hot water heating since they operate under different conditions. Pool water only needs to be heated into the 21°C to 26°C (70°F to 80°F) range, insolation rates — the amount of sunshine available — are higher during summer months, and the collector operates at or near to air temperatures. In fact, pool collectors can even gather heat on cloudy days if the air is warmer than the pool water. In this instance collectors are more efficient if they are not glazed or insulated.



Unglazed Liquid Flat Plate Collector

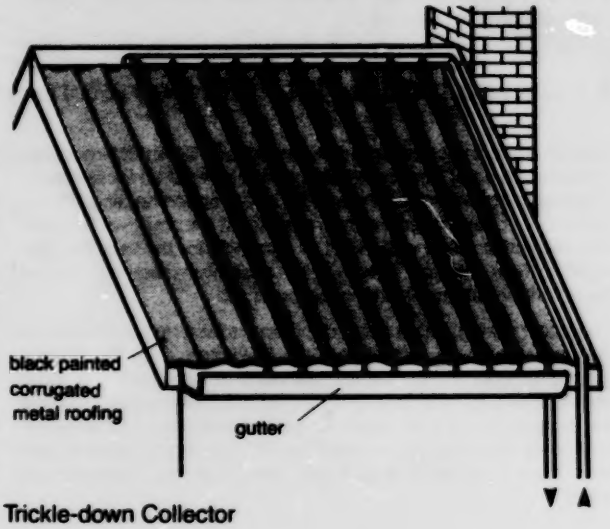
Unglazed collectors can be fabricated from plastic or metals such as copper or aluminum. Plastic collectors are waterproof, have high impact strength, and can withstand a broad temperature range. They are impervious to normal concentrations of chlorine, algae, acid, and pool chemicals. Carbon black and ultra-violet inhibitors are added to the plastic to retard degradation and to improve the solar absorptivity. Plastic collectors should last at least seven years in Canada, and probably much longer.

In all types of plastic collectors, the passageways are distributed uniformly across the surface so that a maximum amount of collector area is wetted; this ensures maximum heat collection. Because plastic is a poor conductor of heat, the close-packed flow channels reduce the temperature difference between the collector surface and the circulated water. If the collector surface becomes too warm, a large amount of heat is lost to the atmosphere. High flow rates also keep collector temperatures low. Pool collectors are always cool to the touch when in operation. In fact, the touch-test is used to check that all the panels in an array are cool and, therefore, are working properly.

When using copper collectors in a solar pool heating system, care must be taken to keep the chlorine within normal levels to avoid corroding the copper. Water which is hygienically acceptable and chemically balanced for pleasant swimming will not affect the life expectancy of copper or plastic components of solar pool heating systems.

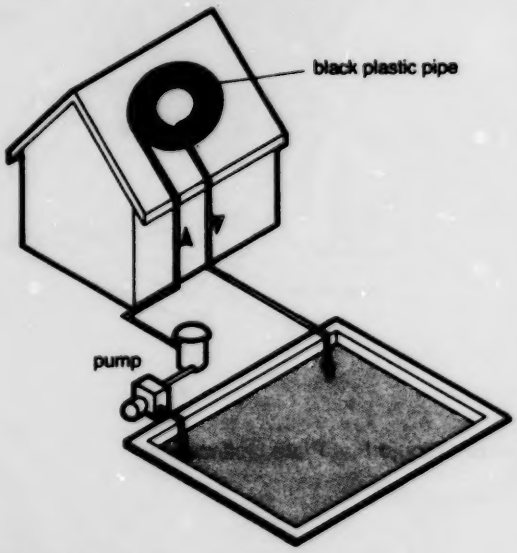
A popular low-cost solar pool heating system uses trickle-down collectors which are usually site-assembled and are well-suited to do-it-yourself construction. With these collectors, water is pumped from the pool to a perforated pipe at the top of a south-facing roof where it trickles down black-painted corrugated metal roofing. A cover of glass or clear plastic may be installed over the roofing to reduce evaporation and produce warmer water. When the solar-heated water gets to the bottom of the roof, it flows into a gutter and runs back to the pool.

A trickle-down collector can be inexpensive, especially if you already have a suitably sized south-facing metal roof with a guttering system. Trickle collectors can perform as efficiently as black plastic pool collectors, although chlorine consumption may be higher, because of a faster rate of evaporation.



Trickle-down Collector

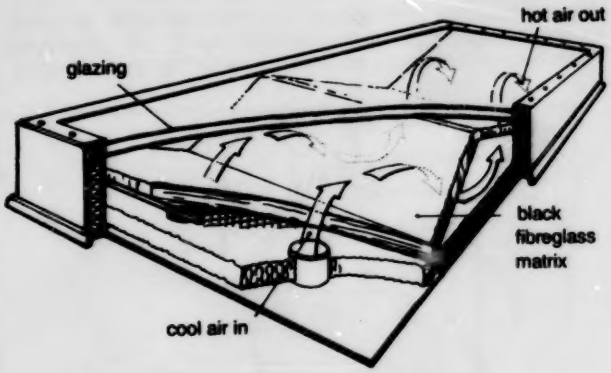
Another common home-made pool collector is constructed of several lengths of black plastic pipe in loops or grids on a convenient roof. The initial cost is low and it can work well if sufficient piping is used (anywhere from 300 to 800 metres (1,000 to 2,500 feet), but design calculations are complex and installation is more difficult than with pre-engineered systems. It must be remembered that the amount of energy collected depends upon the total absorbing area exposed to the sun.



Plumbing Pipe Collector

2.3 Air Flat Plate Collectors

The design of an air flat plate collector is similar to the design of a liquid flat plate collector; both have the same four main components: glazing, absorber, insulation, and collector container.



Air Flat Plate Collector

The main difference between the two types of collectors is in the design of the absorber plate. In contrast to liquid systems, the flow passages in an air collector are not an integral part of the absorber. Instead the air is passed over, behind, or, in the case of a matrix-type collector, through the absorber plate. A matrix collector is made from a perforated material such as black-painted fibreglass or expanded metal mesh.

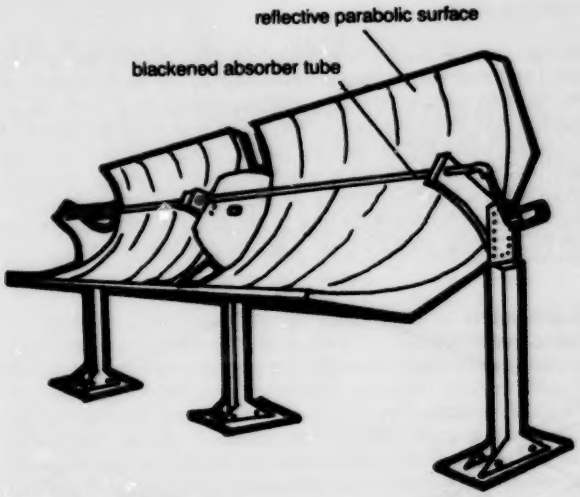
For Canadian conditions, where the collector has to operate at low outside temperatures, it is generally more efficient to move the air behind or through the absorber. However, where there is little difference between the collector temperature and the outside, it is more efficient to move the air on both sides of the absorber.

The efficiency of the heat transfer process between the collector and the absorbing surface can be improved by increasing the surface area and by modifying its shape so that turbulent air conditions are created. Air turbulence, however, increases the energy required to move the air around the system and, beyond a certain point, the overall efficiency of the total system is not enhanced.

2.4 Concentrating and Tracking Collectors

Concentrating collectors use reflective surfaces, lenses or other optical devices to concentrate the sun's rays onto an absorber which is significantly smaller in area than the absorber in a flat plate collector. The heat absorber at the focal point or axis collects the concentrated energy that is generated, making this type of collector suited to high-temperature applications. High temperatures are possible because the area of absorber which is hot is usually small.

There is a variety of concentrating collectors, including parabolic or linear trough collectors, parabolic dish or circular concentrating collectors, and compound parabolic or crab-eye collectors. The most common type of concentrating collector is the parabolic trough which consists of an absorber tube suspended at the focal point of the parabola. In a tracking collector, the entire reflector is mounted on a movable frame and is designed to follow the sun's movement across the sky. In other designs, the reflector is stationary and it is the absorber that moves in position.



Parabolic Trough Collector

In some designs, such as the compound parabolic or crab-eye collector, there is no need for the collector to track the sun on a daily basis. This type of collector is designed so that nearly all the sun's rays entering a deep, curved V-shaped trough are funnelled to the absorber at the bottom. It has the advantage of being able to collect both diffuse and direct sunlight and so can operate on cloudy or overcast days.

In most regions in Canada, the collector should be placed within a glazed structure to protect the mirrors and tracking mechanisms from snow, hail, and freezing rain.

The advantage of a concentrating collector is that it operates at high temperatures and can be used to generate steam or hot water for industrial processes and for air conditioners or chillers. In the future, this type of collector could also be used for thermal power generation. At present, however, most collectors in this category are still in the research stage.

2.5 Evacuated Tube Collectors

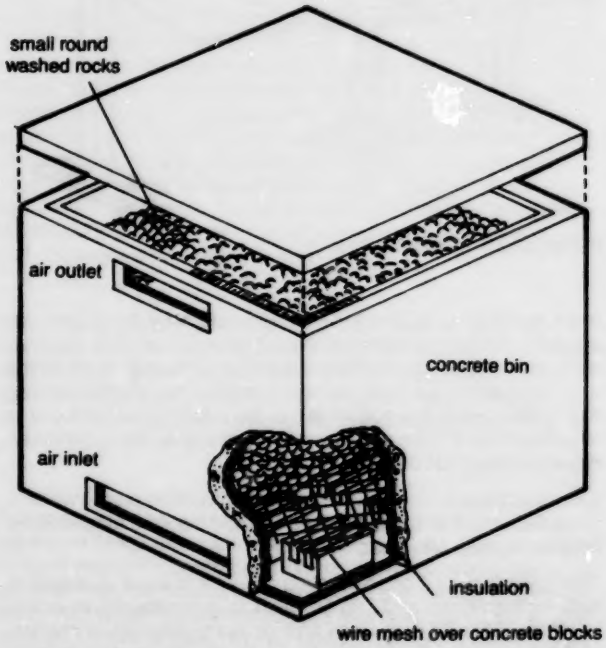
An evacuated tube collector consists of a long thin glass cylinder with an absorber tube inside it. The vacuum between the absorber and the glass tube greatly reduces heat loss, allowing this type of collector to operate in colder air temperatures and with higher fluid temperatures.

Evacuated tube collectors operate by circulating the heat transfer fluid through the absorber tube in a similar manner to a standard collector, or by having a heat pipe within the tube to transfer the heat to the circulation fluid. Because heat losses from evacuated tube collectors are reduced to a minimum, this type of collector is efficient in the cold Canadian climate, and should become more popular. Several makes are already on the market.

2.6 Storage Units

Different storage methods are required for liquid and air space heating systems.

Storage units for air space heating systems are not usually marketed as complete packages, because they are easily fabricated on-site from readily available building materials. The common practice is to fabricate rock storage bins from concrete block or poured concrete and fill them with small rocks or crushed stone of fairly uniform size. Insulation is then applied to the outside of the bin so that the thermal mass of the concrete wall forms part of the storage. Detailed plans on how to construct a rock storage bin can be obtained from most air collector manufacturers.

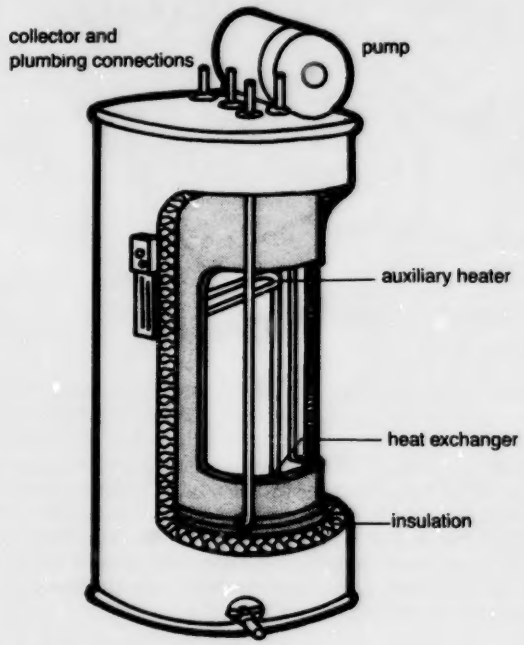


Rock Bin Heat Storage

For liquid space heating systems, specialized large-capacity thermal storage units are available.

Storage tanks for closed loop DHW systems are normally sold as part of a pre-packaged, pre-engineered system and usually include a complete liquid handling unit consisting of pump, valves, sensors, differential controller, and an expansion tank. However, the tanks are also marketed separately, and are similar to conventional hot water tanks except that they include a heat exchanger. The heat exchanger may be either single- or double-walled, and may consist of copper coils within the tank, a wrap-around jacket outside the tank, or a separate unit.

Storage tanks for drain back systems may be similar to closed loop system tanks or they may be simply plastic containers open to atmospheric pressure and wrapped with insulation.



Water Heat Storage Tank

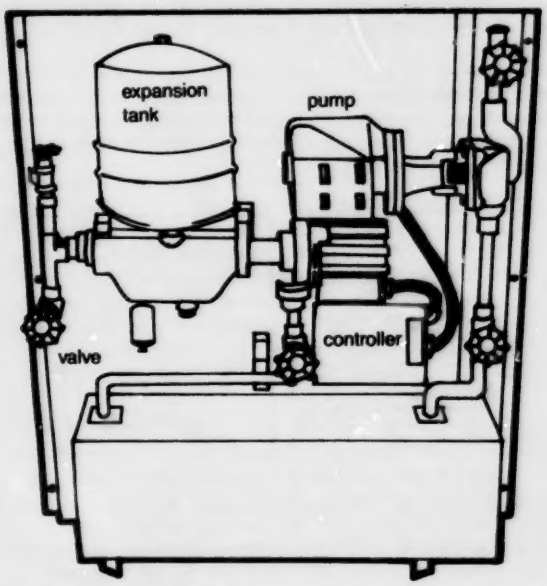
2.7 Handling Units

For solar space, DHW, and pool heating systems, there are advantages in assembling key parts of the circulation, distribution and control system into separate components known as handling units. These units simplify installation on site and allow for a more integrated operation of the system.

A handling unit for space heating systems is designed to switch and direct the heat transfer fluid through a series of operations: heating directly from the collector array, storing heat from the collectors, heating from storage, or supplying back-up heat from the auxiliary heating source.

For air systems, the unit typically consists of back-flow dampers, power dampers with variable speed blowers, and differential thermostat controls. For liquid systems, the various parts which make up the handling unit include check valves, variable-head pumps, differential thermostats, expansion tanks, pressure-relief valves and so on. Similar liquid handling units are used in solar DHW systems.

In the past, pool-heating systems relied on manual operation or on a diverting valve triggered by a separate electronic controller. Now, however, integrated handling units for solar pool heating systems are available, which require only one remote sensor connection and four plumbing connections. These self-contained and fully automatic units include an adjustable controller, an ON-OFF-AUTO switch, a light or dial indicating flow through the array, and a check valve.



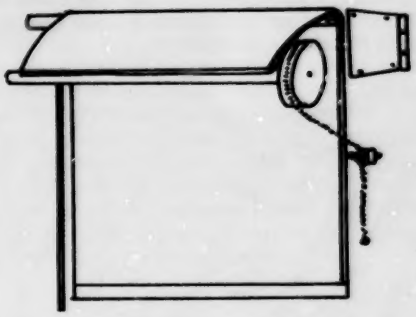
Liquid Handling Unit

2.8 Insulated Windows, Shutters, and Blinds

Heat loss through windows is significant and, even with sealed double-glazed units, it amounts to 15% to 20% of the total heat loss of a typical modern house.

Several techniques are available for insulating the window units themselves to reduce this heat loss. One method insulates by blowing styrene beads between the panes of double glazing at night and then vacuuming them out during the daytime. Windows also can be insulated passively by mounting a permanent grid of transparent plastic film between the glazings to reduce the convective heat transfer between the inner and outer panes of glass. Special coatings can be applied, which allow light through to the interior but reflect the heat.

Windows also can be covered with an insulated shutter or other insulating material. Exterior insulating techniques must be weather-resistant and easily operable in rain, snow, and ice. Interior insulating methods must also act as vapour barriers to reduce moisture condensation on the glass. Some insulating curtains rely on reflecting heat back into the room; others try to slow down the rate of heat transfer, and some use both methods.

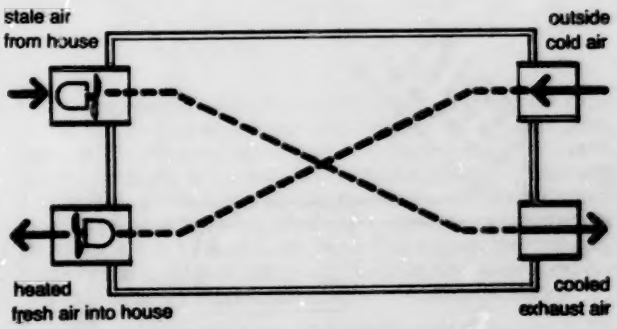


Insulated Window Blind

2.9 Air-to-Air Heat Exchangers

A typical Canadian family produces nearly 13 litres (almost 3 gallons) of water vapour a day from such sources as cooking, bathing, and even breathing. Laundry and house plants can raise water vapour levels even higher. A well-insulated, tightly built house does not leak enough air to remove this much water during the winter when all the windows are closed. Air-tight houses also can become stuffy without adequately controlled ventilation, especially if tobacco smokers are present.

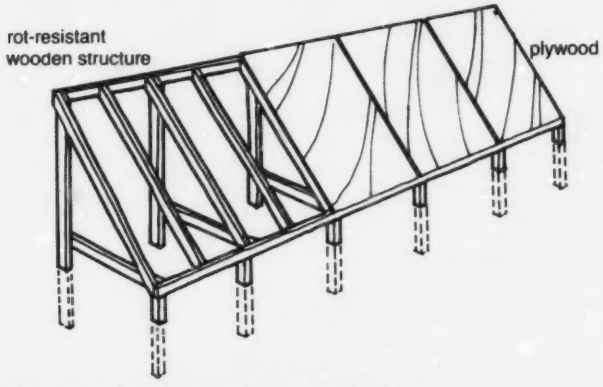
An air-to-air heat exchanger exhausts polluted and humid air from the house while simultaneously transferring the heat from that air to the fresh incoming air. Although these heat exchangers can save significant amounts of energy by pre-heating the incoming air, their principal benefit is to supply controlled ventilation and to exhaust excess humidity from air-tight houses. Even older houses which have been reinsulated, weather-stripped and well-caulked may be tight enough that they require an air-to-air heat exchanger. The market for these heat exchangers is expected to grow rapidly in agricultural, residential, and commercial applications as construction techniques improve and the costs of heating energy increase.



Air-to-Air Heat Exchanger

2.10 Collector Mounting Frames

For flat-roof installations, collectors should be mounted approximately 1.2 metres (4 feet) above the roof in order to prevent excessive build-up of snow. Most solar collector manufacturers can provide custom-designed mounting frames. A number of modular collector support systems are now being marketed. These support systems incorporate special design features which simplify installation and design.

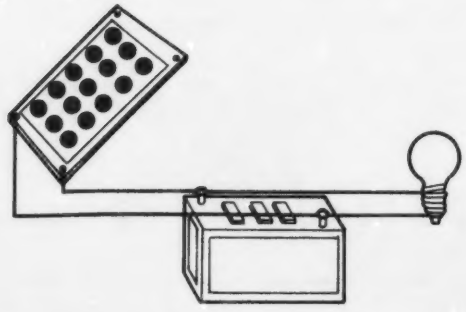


Home-made Collector Mounting Frame

2.11 Photovoltaics

Unlike solar collectors which convert sunshine into heat energy, photovoltaic cells convert it into electrical energy. When sunlight strikes the surface of a photovoltaic cell, usually a single crystal silicon about 100 mm (4 inches) in diameter, a voltage is generated across the cell. By connecting a number of cells together in series, sufficient voltage can be generated; and by connecting them together in parallel, sufficient current can be generated for applications such as battery charging, radio and microwave transmission, communications, navigational aids, and even household power supply.

Photovoltaic cells were developed for the USA space program, and their use is still restricted to specific applications because of the relatively high cost of manufacturing the individual cells. However, as the cost of producing the cells is reduced, photovoltaic systems will become more and more popular.



Photovoltaic System

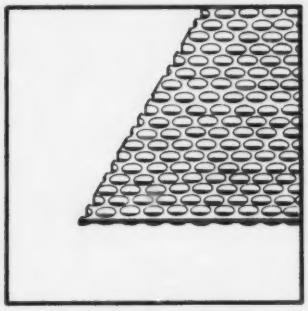
2.12 Insulating Swimming Pool Covers

There are two basic types of pool covers: protective winter covers and insulating summer covers.

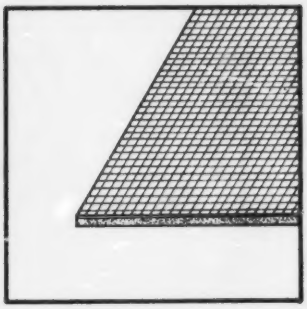
Heavy-duty winter pool covers are used for safety and to protect the pool against ice, snow, and debris. They are usually tied down and anchored, and are too cumbersome for daily summer use. They lack insulation and, because they are opaque, do not allow the sun's rays through to warm the water. For these reasons, winter covers have not been included in this ***Catalogue***.

A well-fitting summertime pool cover insulates the surface of the water and can reduce most of the heat loss from evaporation, radiation, and convection. These pool covers also act to reduce maintenance time by keeping unwanted dirt and debris out of the water. Covers should always be used on any pool which is heated.

There are three basic types of summertime pool covers: clear plastic sheets, translucent bubble-type blankets, and opaque foam blankets. All are made of plastic and are intended to float on the surface of the water.



Bubble Blanket



Opaque Thermal Blanket

The bubble-type solar blanket allows some of the solar radiation to penetrate it for subsequent absorption as heat in the pool water, and the bubbles provide a certain amount of thermal insulation. The foam backing on the opaque covers provides thermal insulation to retain heat in the pool, but these covers result in somewhat lower pool temperatures than the clear types by preventing much of the naturally incident solar energy from entering the pool water. These covers are best removed on sunny days to allow for passive solar gains.

Pool chemicals, rough handling, and the ultraviolet rays of the sun cause deterioration of the plastics, so be sure to check the length of the warranty to determine the life expectancy of the different products. Large pool covers may be awkward to handle, and you may consider a special roller at one end of the pool to roll up the cover when the pool is being used.

Air-inflated plastic domes can also be used to provide passive heating for pools, but these are not standard production items and have to be custom-made by a vinyl-fabricating company.

3. Parts and Materials

3.1 Collector Glazing

Glazing can be made out of a variety of different materials, such as glass, clear rigid plastics, thin-film flexible plastics, and semi-rigid translucent plastics.

Clear glass is one of the most commonly used materials for glazing flat plate collectors. Glass is durable, resists wear, and has good optical properties, but it is also brittle, heavy, difficult to handle, and expensive to buy. Most solar collectors now use tempered low-iron glass which has improved light transmission properties. Also available are special types of glass with textured surfaces to reduce glare and reflection losses.

In general, plastics have the advantage of being light-weight and impact-resistant, while their main disadvantages are limited durability and poor resistance to mechanical wear.

Polycarbonate and acrylic are the two main types of clear rigid plastics. Polycarbonate appears not to have long-term durability against ultraviolet degradation and while acrylic does not have this problem, it does have a temperature limit of around 90°C. This means that for medium-temperature collectors acrylic has to be protected from the high temperatures of the absorber by some form of additional inner glazing film. Both polycarbonate and acrylic have high coefficients of expansion, and sufficient allowance must be made for thermal movement in the collector design.

Two thin-film flexible glazings, which have both high temperature and ultraviolet resistance and are suited for use in collectors, are Tedlar and Teflon. Each film has compensating advantages and disadvantages. Tedlar, as the outer glazing, has good strength properties but poor optical properties in that the material is relatively transparent to thermal radiation. Teflon, as the inner glazing, has poor strength properties but good optical properties. The combination of the materials provides a satisfactory glazing option.

Other types of thin transparent plastics, such as ultraviolet-stabilized polyethylene and Mylar, are not generally considered suitable for collectors because of poor durability, optical and thermal properties, and low temperature limits. These materials, however, can be used for greenhouse glazings.

Some of the semi-rigid, fibreglass-reinforced plastics are suitable for use in both solar collectors and greenhouses. Although this type of material is naturally translucent, it can have better light transmission properties than some types of glass, especially under cloudy or diffuse light conditions. Its main disadvantage is limited durability, but the compensating advantages of low cost and easy installation make it a material particularly suitable for do-it-yourself applications.

3.2 Absorbers and Coatings

Absorbers for flat plate collectors are classified as liquid-type or air-type.

The most common design for liquid absorbers is the plate-and-tube type. These absorbers consist of a grid of tubes several inches apart bonded to a single metal sheet. The tubes, connected to common header pipes at the top and bottom, can be on the surface of the absorber plate or can be recessed into grooves in the plate to increase the contact area and so improve performance. A variation of this type is called a fin-and-tube absorber, the only difference being that each tube is attached to an individual strip of absorber, and all of them are overlapped slightly to accommodate thermal movement more easily.

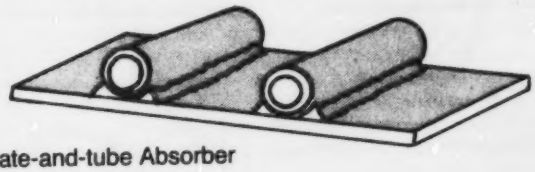
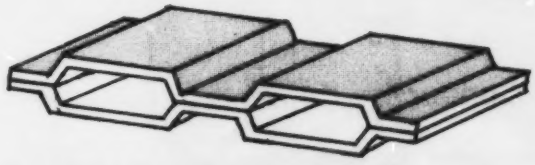


Plate-and-tube Absorber

Recessed-tube Absorber

A second basic type of liquid absorber is referred to as a tube-in-sheet. Several different processes are used, in which two thin sheets of metal are partially joined together in a pattern to form a series of interconnecting passageways. This results in a large portion of the absorber surface being in direct contact with the heat transfer liquid.



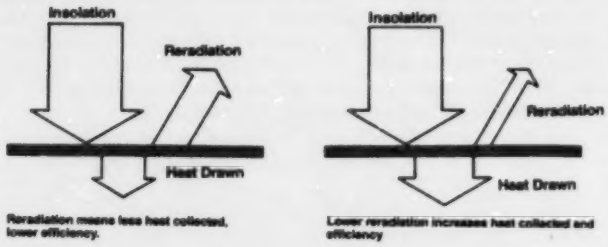
Tube-in-Sheet Absorber

Liquid absorber plates come in aluminum, copper, or steel. Copper is the traditional material and remains the most popular, although it is more expensive than the others. If dissimilar metals are used, such as is the case with aluminum absorber plates with copper riser tubes, steps must be taken to avoid galvanic corrosion. Steel is a relative newcomer as an absorber material and is the cheapest of the materials, but it has a lower thermal conductivity than copper or aluminum. Stainless steel is more expensive than ordinary steel but has better corrosion resistance.

The various types of air absorber plates were described in the section on air flat plate collectors.

The surface of an absorber must be black to absorb solar radiation and convert it into heat most effectively. The two most common types of absorber coatings are paint or an electroplated selective surface applied directly to the absorber or to a film which is then stuck onto the absorber.

A number of flat black paints have been developed to withstand the extreme conditions experienced in a solar collector. These paints have a high absorptivity, but also a moderate-to-high emissivity — that is they absorb a high percentage of the solar radiation striking them but also reradiate a considerable amount of the thermal energy. The special paints hold up well against the high temperatures to which they are continually exposed.



Flat Black Paint

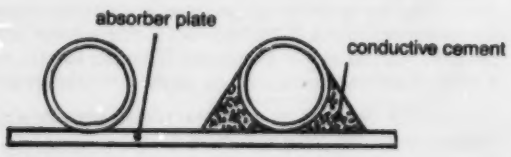
Selective Surface

The performance of a solar collector can be improved by the application of a selective surface to the absorber. For high efficiency, the selective surface should be efficient at absorbing short-wave solar radiation but inefficient at reradiating long-wave thermal radiation. Two of the most efficient selective surfaces are black chrome and black nickel, both of which have to be electroplated onto the absorber surface. Black nickel has good optical properties but without special treatment it is not durable. Black chrome, on the other hand, is much more durable and also has good optical properties. Selective surface paints are available and, although they are generally not as good as electroplated finishes, their initial cost is less.

Black chrome has become the most popular surface for liquid flat plate collectors, especially in combination with single-glazing. Double-glazing appears to work more effectively with a non-selective absorber as it helps to insulate against the reradiated heat losses.

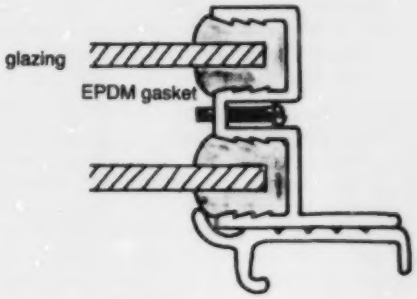
3.3 Conductive Cements

Joining together absorber plates and riser tubes of different materials to ensure a good bond, which allows the heat to flow through, has always been a problem. Conductive cements have been developed which have good heat transfer properties. They can be used to adhere copper tubing to aluminum absorber plates and to bond wrap-around heat exchangers to the outside of hot water tanks to provide double-wall protection.



3.4 Gaskets, Sealants, and Tapes

The main purpose of gaskets, sealants, and tapes is to prevent the passage of moisture, air, dust, and heat. A key criterion for both gasket and sealants used in solar collectors is thermal stability. The materials next to the absorber must be capable of withstanding temperatures of over 200°C. Silicone rubber is probably the only common gasket material capable of enduring such high temperatures. Materials not directly in contact with the absorber do not experience such high temperatures, and in these locations more economical materials, such as EPDM rubber, can be used as they have a maximum service temperature of around 150°C.



Collector Glazing Gasket

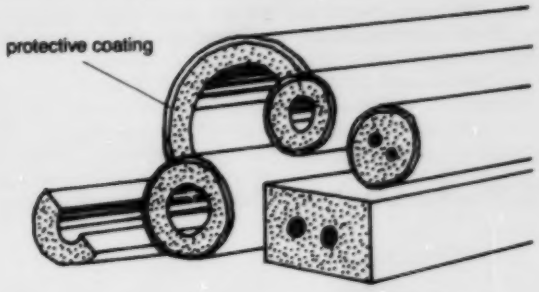
3.5 Insulation

Different types of insulating materials are used in solar heating systems, depending on whether they are used in collectors, around pipes and ductwork, or around thermal storage containers.

The insulation used in solar collectors has to be able to withstand stagnation temperatures which, depending on collector design, may reach 250°C (480°F). The stagnation temperature is the highest temperature the collector experiences under high sunshine intensity, high ambient temperature and no-flow conditions. The insulation must be able to survive these temperatures without losing any of its insulating properties and without giving off any gases that might corrode the collector or coat the inner side of the glazing and thus reduce the amount of solar radiation reaching the absorber.

One common type of insulation in solar collectors is an industrial grade semi-rigid fibreglass board especially treated to prevent out-gassing of the binders at elevated temperatures. Other types of insulation used in collectors include phenol formaldehyde, urethane foam, and polyisocyanurate foam.

The four main types of insulations used to insulate exterior piping are fibreglass, elastomers, urethane, and isocyanurates. Fibreglass and urethane insulation can be purchased in preformed sections and must be protected from weather and ultraviolet degradation by a watertight plastic or metallic jacket. Special covers for joints at elbows and tee fittings are available. Elastomeric insulation must be protected by a special ultraviolet-resistant paint or preferably by a separate metal flashing. Even with the ultraviolet-resistant paint, experience has shown that the out-of-doors durability of this type of insulation is questionable.



Preformed Pipe Insulation

Until recently, isocyanurate insulation was difficult to obtain in Canada although now the product is available through specialised distributors. The product has good insulating properties and long-term durability if protected by an ultraviolet-inhibited PVC jacket.

A variety of different insulating materials can be used for storage insulation depending on the specific design of the storage. Key criteria are permeability, the effect of high temperatures on the insulation, and the insulating valve.

3.6 Reflective Surfaces

Reflective surfaces are used in solar heating systems on concentrating collectors, on the north wall of a solar greenhouse, or on the back of a collector enclosure where there are several rows of collectors on a flat roof. Reflective surfaces can be classified as rigid surfaces, such as polished aluminum and silvered glass, or thin-film surfaces such as aluminized Mylar or acrylic.

In general, plastic materials are not as durable as glass or metal and all types of reflective surfaces tend to lose some of their reflective properties in time. The addition of a protective, transparent layer of more durable material can extend the useful lifetime of the reflective surface. For example, anodized aluminum can be protected by a thin layer of aluminum oxide which is applied by an electrochemical process. However, these protective layers tend to decrease the reflective properties of the original material, although this level of performance is maintained for a longer period.

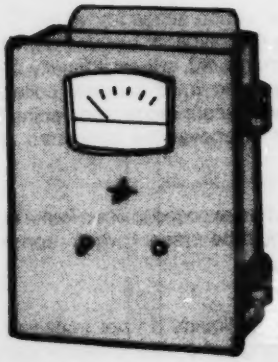
3.7 Controls

The function of a control mechanism is to regulate the transfer of energy through the collector array, storage unit, and distribution system by means of thermostatic controls, heat sensors, and ON-OFF activators. The operation and design of the control mechanism varies, depending on the type of solar heating system.

For pool heating, the control system regulates the circulation of water between the pool and the collectors. Two sensors are required, one at the collector and one at the pool. When the temperature at the collector is higher than the temperature of the pool by a pre-set amount, the water is diverted through the collector array. When the temperature at the collector falls near to that of the pool, the controller automatically opens the diverting valve and the water flows straight from the pump and filter back into the pool.

For domestic water heating, the same basic operation is involved, except that the controller turns the pump on and off. Options may be added depending on the system design. One option is a freeze-protection circuit which will open a drain down valve when the temperature in the collector is near freezing. A second option is a temperature moderating valve which regulates the maximum temperature of the water coming from the storage tank. A third option is the automatic activation of the auxiliary heating source when the temperature in the storage tank drops below a certain point.

For space heating, the control functions are similar although other options may be added. For example, variable-flow controllers are available, which control the flow rate proportionally to the difference between the collector inlet and outlet temperatures. This has the advantage that the system operates more efficiently due to earlier start-up and later shut-off. In addition, less power is required to operate the system, which results in energy savings.



Differential Thermostat

Various custom-designed control units are now on the market which carry out a range of different tasks, and system monitors are available which provide an instant read-out on the mode of operation and individual temperatures in many parts of the system.

3.8 Heat-Transfer Liquids

Water can be used to transfer the heat from collectors to the storage unit. Although water has excellent heat transfer properties, it can only be used in drain down and drain back systems because of its high freezing point (0°C) and low boiling point (100°C). Special inhibitors have to be added to provide corrosion protection, and microbiocides and algicides may also need to be added.

Specialized heat-transfer liquids that do not freeze can be used if they are contained within a closed plumbing loop connecting the collectors to the storage. The four main types of non-freezing heat-transfer liquids are ethylene glycols, propylene glycols, non-aqueous organic liquids, and silicone oils.

Ethylene glycol is a standard automotive antifreeze that is added to water to prevent it from freezing. The antifreeze requires periodic replacement, and careful checks have to be made to ensure that the corrosion protection provided by the inhibitors is still active. Ethylene glycol is highly toxic and many jurisdictions do not permit its use in single-wall heat exchangers in DHW systems.

Propylene glycol is the most common antifreeze used in closed loop solar DHW systems. It has similar properties to ethylene glycol except that it is not toxic, so it can be used in systems with single-wall heat exchangers. Some authorities, however, still require double-wall protection because they fear that ethylene glycol may be substituted for propylene glycol at a later date.

Although propylene glycol itself is considered safe for use in foods, beverages, and pharmaceuticals, the corrosion-inhibitors and anti-foaming agents are not usually food-grade but, as they are present in low levels, toxicity levels are usually only slightly affected.

Glycols degrade at temperatures above 160°C (320°F) and become corrosive as the inhibitors become depleted. Fluid quality must be regularly monitored, at least annually, and inhibitor levels maintained. Since some liquid flat plate collectors stagnate at temperatures above glycol's degradation point, fluid quality also must be checked whenever the collectors reach stagnation conditions.

Glycols can flash when exposed to open flame but will not burn. A fire extinguisher must be present when repairs are made to a system.

Non-aqueous organic liquids do not freeze or boil within the normal operating range of a solar collector system. The disadvantages of such liquids are their low specific heat and high viscosity, which means that more energy has to be expended extracting the same amount of heat from the collector. In addition, some of the liquids have a low flash point, so that if a leak develops and the hot liquid contacts air, a serious fire hazard could exist.

Silicone oils have properties similar to the organic liquids. They are nontoxic, noncorrosive and nonfreezing, but have a low specific heat and high viscosity.

3.9 Monitoring Devices

At the present stage of the development of solar technology, it is important to monitor the performance of solar systems to assess whether the systems are operating properly. Monitoring can be carried out at various levels of complexity. The equipment can be as simple as thermometers and pressure gauges or as sophisticated as micro-processor data acquisition systems connected by phone to a central computer. Most monitoring devices are standard scientific instruments and are not listed in this catalogue. Only equipment specifically designed for solar systems is included.

3.10 Phase-Change Materials

Solar energy is most commonly stored as sensible heat in a solid or a liquid, such as in rock bins or water tanks. However, energy can also be stored as heat of fusion in materials that change state with temperature, as in the case of water which changes into ice. Paraffin waxes and certain salts are the more common phase-change energy-storing materials in solar heating systems.

The principle behind a phase-change material is that, as it passes from one chemical state to another, it releases or absorbs large amounts of heat. For example, a change from a solid to a liquid state (the melting of the salt) can be used to store heat, while the reverse transition (solidification) releases heat.

A problem with some phase-change materials is that, after changing state many times, a breakdown in the chemical structure occurs and the phase-change may fail to occur. The most common phase-change material is sodium sulphate decahydrate, known as Glauber's salts, although additives are used to lower the transition temperature so that the phase-change occurs just above room temperature.

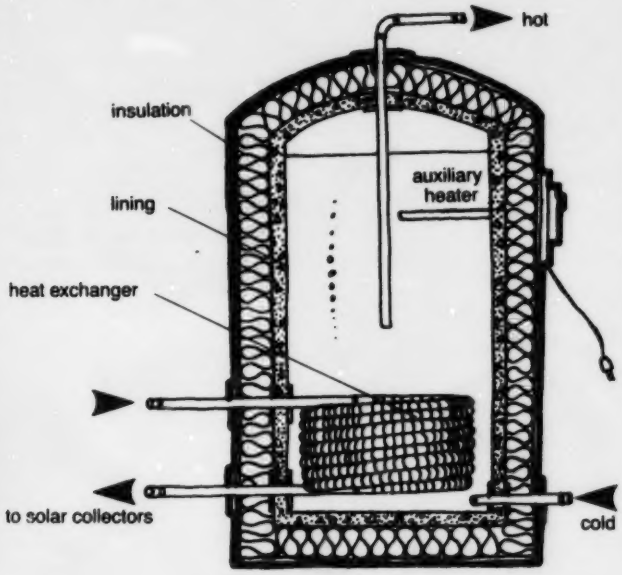
3.11 Pumps

Circulation pumps are usually specifically designed for use in solar heating systems. Solar pumps used to pump drinking water (referred to as "potable" water in the trade) must be designed so that all water-touched parts are non-rusting. Pumps used in closed loops must be compatible with antifreezes and high heat-transfer fluid temperatures. Pumps must have sufficient capacity to meet the system's pressure and flow requirements as well as maintain the head, the height from pump to collectors that the fluid must be lifted. Some pumps have a variable head/flow control to fine-tune a pump to a specific system, while others are designed for drain back systems with higher head requirements.

3.12 Liquid-to-Liquid Heat Exchangers

Heat exchangers are used in solar DHW systems to transfer heat from the liquid circulating from the solar collectors to the domestic hot water supply. Double-wall heat exchangers are required for systems that use toxic heat-transfer fluids, and may still be required in certain jurisdictions for non-toxic fluids, so that there is no possibility of contaminating the domestic water.

Single-wall heat exchangers usually consist of a coil of piping inside the hot water storage tank. As domestic hot water is drawn off from the tank, it carries off the heat transferred from the collector loop. Other types of liquid-to-liquid heat exchangers are tube-in-shell heat exchangers in which one fluid circulates through tubes inside a larger shell which contains the other fluid, wrap-around heat exchangers which are wrapped around the outside of the storage tank, and plate heat exchangers.



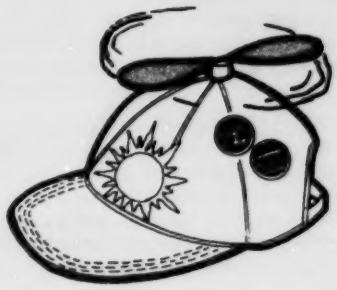
Single-Wall Heat Exchanger

3.13 Passive Devices

A variety of automatic devices are used to prevent solar overheating. These devices are activated by changes in temperature and do not rely on electricity or other external power supply.

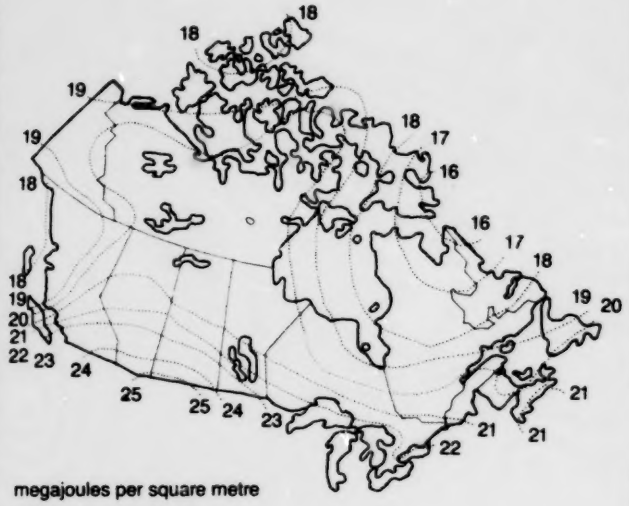
3.14 Solar Gadgets

A number of solar-powered toys and displays are on the market which use photovoltaic cells to power an electrical mechanism. This section also includes any solar items which do not fall into any of the preceding categories.



4. Solar Design Aids

Mean Daily Solar Radiation in July



megajoules per square metre

1 MJ/m² = 88 BTU/sq.ft.

4.1 Computer Design Programs

A variety of computer programs are available to help solar designers analyze thermal and economic performance data for active and passive solar systems. Prediction of performance is based on equipment characteristics and meteorological records. Other programs compare life-cycle costs, produce hour-by-hour energy audits, size components, analyze building heat loads, compute the portion of the heating load supplied by solar, and allow the designer to make conceptual changes in the systems to see what the effect on the performance will be.

Other computer programs allow designers to determine the most cost-effective passive design by calculating and comparing different types and sizes of systems, different building materials, use of night insulation, and even alternate building designs with different heating loads and different back-up heating systems. These programs use meteorological data and predict the thermal performance of passive systems over hourly, daily, monthly, or yearly cycles.

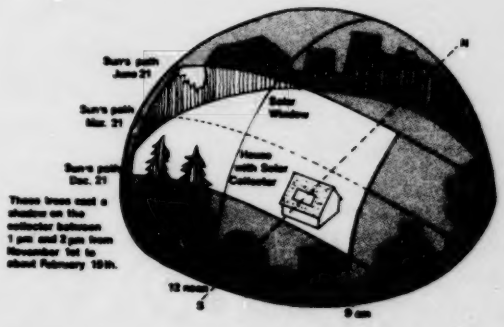
This section of the ***Solar Heating Catalogue No. 3*** provides a brief list of computer programs available for use on hand-held calculators, programmable calculators, micro- and mini-computers, and large main-frame computers.

4.2 Computer Design Services

A number of organizations provide computer design services for those who do not have their own computer. Generally, these services use the computer programs already described in Section 4.1.

4.3 Solar Access Measurement

Determining how much direct sun is actually available at a specific site is necessary to fine-tune the design of a solar heating system. A number of techniques, such as "The Solar Window", can be used, or special devices can be used which can actually produce a shadow map of the site. So far, none of these devices is manufactured or distributed in Canada, but several products from the USA are listed.


Sun's path June 21
Sun's path Mar. 21
Sun's path Dec. 21
Solar Window
Viewing with Solar Collector
These trees cast a shadow on the collector between 1 pm and 2 pm from November 1st to about February 10th.
12 noon
9 am

Solar Window

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ECON	British Columbia Designers
Econergie Ltée	Québec Designers
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Energy Conversions Co.	Ontario Research and Development
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Giffels Associates Ltd.	Ontario Designers
Glazier Plumbing & Heating Ltd.	British Columbia Installers
Goodkey Weedmark & Assoc. Ltd.	Ontario Designers
Gough, Bruce D., & Assoc.	Ontario Designers
Granzotto Mechanical Inc.	Ontario Installers
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M & H Mechanical Ltd.	New Brunswick Installers
MACEM	Québec Public Information
Magnus Chemicals Ltd.	Québec Manufacturers
Maple Ridge Solar Ltd.	British Columbia Distributors
Marcotte Mechanical Ltd.	Ontario Installers
Markko Construction	Ontario Manufacturers
Master Plumbing & Heating Co. Ltd.	Manitoba Installers
Matériaux L.B.S. Inc.	Québec Distributors
Mayo, Timothy, B. Arch.	Ontario Designers
McCreery, William, Architects	British Columbia Designers
McGregor, D.E. and Assoc. Ltd.	Ontario Designers
McKee, Lockhart & Assoc. Ltd.	Ontario Designers
McManus, T. Lamb & Assoc. Ltd.	Alberta Designers
Meccon Installations Ltd.	Alberta Installers
Mechanical Consultants Western Ltd.	Ontario Designers
Mechanical Contracting Trades Ltd.	Ontario Installers
Métalbec Ltée	Québec Installers
Meuser, Gord, Design	Ontario Designers
Middleton Associates	Ontario Research and Development
Mitchell Partnership Ltd. (The)	Ontario Designers
Modern Mechanical	Ontario Installers
Monarch Plumbing & Heating Co. Ltd.	Saskatchewan Installers
Moncton Plumbing & Supply Co. Ltd.	New Brunswick Installers
Moriyama & Teshima Architects	Ontario Designers
Murfitt, G.R., & Associate	Québec Designers

National Research Council	Ontario Public Information
National Solar Test Facility	Ontario Research and Development
Natural Energy Systems of Canada	Manitoba Manufacturers
Neico Mechanical Ltd.	Ontario Installers
Nicholson, Nick	Québec Public Information
Nordstrom, Lawrence, Enterprises Ltd.	Manitoba Distributors
Nortec Solar Industries Inc.	Ontario Manufacturers
Norton, J.A., Co. Ltd.	Ontario Installers
NRG Consultants Inc.	Ontario Research and Development

O Associates	Nova Scotia Designers
OBOE Engineering Ltd.	Ontario Designers
Okins, Leipciger, Cuplinskas, Kaminker & Assoc. Ltd.	Ontario Designers
Olympic Plumbing & Heating	Ontario Installers
Ontario Research Foundation	Ontario Research and Development
Ontor Ltd.	Ontario Distributors

Pacific Solar Home and Energy Retrofit Ltd.	British Columbia Installers
Parasol Engineering Inc.	British Columbia Designers
Parisel, Claude	Québec Designers
Parker, G. Robert, Assoc.	Nova Scotia Designers
Parsons Construction Co.	New Brunswick Designers
Passive Solar Designs Ltd.	Alberta Designers
Passive Solar Products Ltd.	Saskatchewan Manufacturers
Petrie, William, & Sons Ltd.	Ontario Installers
Petro-Sun Inc.	Québec Manufacturers
Philips Electronics Ltd.	Ontario Distributors
Piotrowski Consultants Ltd.	Ontario Designers
Plomberie Beaudoin, Y., inc.	Québec Installers
Plomberie Girard, A., Ltée	Québec Installers
Plomberie Narbonne & Fils	Québec Installers
Plomberie Sol-Air-Eau du Bas St-Laurent Inc.	Québec Installers
Plomberie St. Pie X	Québec Installers
Poly Réfrigération Inc.	Québec Installers
Polytarp Products	Ontario Manufacturers
Prairie Solar Systems Ltd.	Alberta Designers
Premier Plumbing & Heating Ltd.	British Columbia Installers
Proctor & Redfern Ltd.	Ontario Designers
Progressive Energy	Ontario Research and Development
Prometheus Energy	Ontario Distributors
Pro-Tel	Ontario Installers

Ram Mechanical Contractors	Ontario Installers
Rankin's, V., Mechanical Contracting Ltd.	Nova Scotia Installers
Reid, Crowther & Partners Ltd.	Alberta Designers
Reid, Crowther & Partners Ltd.	British Columbia Designers
Reid, Crowther & Partners Ltd.	Ontario Designers
Rekken, Gilbert, & Assoc. Ltd.	Alberta Designers
Renewable Energy in Canada	Ontario Public Information
Renewable Energy Systems Ltd.	Prince Edward Island Designers
Retro Excavation Inc.	Québec Designers
Renndale Solar Assoc. Ltd.	Ontario Installers

Reynolds Extrusion Co. Ltd.	Ontario Manufacturers
Richards, J.L., & Assoc. Ltd.	Ontario Designers
Richardson, John, Associates	British Columbia Designers
Rocky of B.C. Leisure Ltd.	British Columbia Manufacturers
Roney Systems & Construction	Ontario Designers
Roseisle Building & Design Workshop	Manitoba Designers
Ross, Alister M.	Ontario Designers
Ross, Charles, Architect	Québec Designers
RSV Engineering Services	Ontario Designers
Rudderham, J.W., Ltd.	Nova Scotia Installers
Ryerson Energy Centre	Ontario Public Information

Saskatchewan Minerals	Saskatchewan Manufacturers
Saskmont Engineering Co. Ltd.	Alberta Designers
Saskmont Engineering Co. Ltd.	Saskatchewan Designers
Sawtell Solar Ltd.	Ontario Installers
Scanada Consultants Ltd.	Ontario Research and Development
Schaefer, D.E., Architect Ltd.	Alberta Designers
Scouten, Mitchell, Sigurdson & Assoc. Ltd.	Manitoba Designers
SCP Solar Division	Québec Distributors
Sealed Air of Canada Ltd.	Ontario Manufacturers
Sedum, Kanerva & Assoc.	Ontario Designers
Séguin, Emil & Fils Ltée	Québec Installers
Séguin, Ovide, Ltée	Québec Installers
SESCI Calgary	Alberta Public Information
SESCI Eastern Ontario	Ontario Public Information
SESCI Hamilton	Ontario Public Information
SESCI Kawartha	Ontario Public Information
SESCI Kent	Ontario Public Information
SESCI Lethbridge	Alberta Public Information
SESCI Manitoba	Manitoba Public Information
SESCI Mississauga-Oakville	Ontario Public Information
SESCI New Brunswick	New Brunswick Public Information
SESCI Newfoundland	Newfoundland Public Information
SESCI Northern Alberta	Alberta Public Information
SESCI Northern Saskatchewan	Saskatchewan Public Information
SESCI Nova Scotia	Nova Scotia Public Information
SESCI Okanagan	British Columbia Public Information
SESCI Ottawa	Ontario Public Information
SESCI Québec	Québec Public Information
SESCI Regina	Saskatchewan Public Information
SESCI Sarnia	Ontario Public Information
SESCI Simcoe County	Ontario Public Information
SESCI South West Ontario	Ontario Public Information
SESCI Swift Current	Saskatchewan Public Information
SESCI Toronto	Ontario Public Information
SESCI Vancouver	British Columbia Public Information
SESCI Vancouver Island	British Columbia Public Information
SESCI Waterloo	Ontario Public Information
SESCI Windsor-Essex	Ontario Public Information
Shawmont Newfoundland Ltd.	Newfoundland Installers
Shelter Construction & Development Ltd.	Ontario Designers
Silonex Inc.	Québec Manufacturers
Slater, Norman, Architect	Québec Designers
Smith, A.O., Corp.	Ontario Manufacturers
Smith & Andersen Consulting Engineers Ltd.	Ontario Designers
Smith, David, Mechanical Consultants Ltd.	British Columbia Designers
Solace Energy Centre	British Columbia Designers
Solagreen	Ontario Designers
Solaire B.F.G. Ltée	Québec Installers
Solaquair Corp.	Ontario Manufacturers
Solar Applications & Research	British Columbia Designers

Solar Canada	Ontario Distributors
Solar Educational Services	Alberta Public Information
Solar Energy Society of Canada Inc. see also SESCI;	Manitoba Public Information
Solar Energy Systems Inc.	Prince Edward Island Distributors
Solar Engineering Group Ltd.	Alberta Distributors
Solar Group Architects (The)	British Columbia Designers
Solar Power Developments Ltd.	Ontario Designers
Solar Source Developments Inc.	Ontario Installers
Solar Supply & Insulation	Ontario Distributors
Solar Swim	Ontario Installers
Solar Temp Systems Ltd.	Ontario Manufacturers
Solar World Heating Systems Corp.	Ontario Manufacturers
Solarcells Ltd.	Ontario Manufacturers
Solarctic Energy Conscious Housing Inc.	Ontario Designers
Solarfin Products	Ontario Manufacturers
Solargetics Ltd.	Québec Research and Development
Solarmart	Ontario Distributors
Solarmec Ltée	Québec Manufacturers
Solarpanels Ltd.	Ontario Manufacturers
Solarplast Ltd.	Ontario Manufacturers
SolarQuip Sales	Ontario Distributors
Solarsystems Industries Ltd.	British Columbia Manufacturers
Solartech Ltd.	Ontario Manufacturers
Solatherm Inc.	Ontario Manufacturers
Solcan Ltd.	Ontario Manufacturers
Soleast Energy Enterprises	Nova Scotia Designers
Solestial Solar Panels Ltd.	Ontario Manufacturers
Solray Plumbing & Heating	British Columbia Installers
Solsearch Inc.	Prince Edward Island Designers
Solterra Developments Ltd.	Ontario Designers
Solun Corporation Ltd.	Ontario Installers
Sol-Abode	Nova Scotia Designers
Sol-Tech Housing Calgary Ltd.	Alberta Designers
Sol-Way Engineering Ltd.	British Columbia Manufacturers
Somec Inc.	Québec Installers
Somfay, J.C.	Ontario Designers
Sonotek Ltd.	Ontario Manufacturers
Souris Energy Council	Prince Edward Island Public Information
Speers McGonigal Ltd.	Manitoba Designers
Sperry Assoc. Ltd.	Nova Scotia Designers
Spider Engineering Assoc. (Waterloo) Inc.	Ontario Designers
Steen Contractors Ltd.	Nova Scotia Installers
Stoneybrooke Solar Systems Ltd.	Ontario Designers
Stranghetta Ltd.	Ontario Installers
Studio Por	Ontario Designers
Sun Centre Systems	Saskatchewan Designers
Sun Creations Ltd.	Manitoba Distributors
Sun Dial Solar Systems	British Columbia Installers
Sun Energy Design Assoc. Ltd.	Alberta Designers
Sun Energy Engineering Ltd.	Alberta Designers
Sun Fuels Division	Nova Scotia Distributors
Sun God Solar Systems	British Columbia Distributors
Sun Parlor Solar	Ontario Designers
Sun Ross	Nova Scotia Installers
Sun Valley Pools Ltd.	Manitoba Distributors
Sunarc Products Inc.	Québec Installers
Sunbuilders Inc.	Ontario Designers
Sunergy Systems Ltd.	Alberta Designers
Sunglo Solar Ltd.	Ontario Manufacturers
Sunhouse Homes Ltd.	Saskatchewan Designers
Suntek Solar Heating Systems Ltd.	British Columbia Designers
Suntrap Systems	Ontario Distributors
Suntricity	Ontario Installers
Sunwise Systems	British Columbia Designers
Sunwrights (The)	Ontario Public Information
Sun-Ray Solar Systems Ltd.	Ontario Manufacturers
Sun-Sense Ltd.	Ontario Installers
Swan, Wooster Engineering Co. Ltd.	Ontario Designers
S-Matrix Enterprises Ltd.	British Columbia Designers
Taco (Canada) Ltd.	Ontario Manufacturers
Techni-Solaire Ltée.	Québec Installers
Tempglass Ltd.	Ontario Manufacturers
Temperature Specialties Manufacturers Ltd. (Temspec)	Ontario Manufacturers
T.E.S. Ltd.	Ontario Research and Development
Thermo Shutter	Ontario Manufacturers
Thermon Canada Ltd.	Ontario Manufacturers
Thomson, D.W., Consultants Ltd.	British Columbia Designers
Thorpe Brothers Ltd.	Saskatchewan Installers
Torontario Int. Mech. & Elec. Co. Ltd.	Ontario Installers
Total Mechanical Systems	British Columbia Installers
Townend, Stefura, Baleshta & Nicholls, Arch.	Ontario Designers
TPK Solar Systems Inc.	Ontario Manufacturers
Trans Island Mechanical Co. Ltd.	Newfoundland Installers
Tremco Canada Ltd.	Ontario Manufacturers
Tri Energy Tech Inc.	British Columbia Distributors
Trivco Promotions Inc.	Ontario Distributors
TSOW/Pollard Partnership	Ontario Designers
Twin Valleys School	Ontario Public Information
Tymura Solar Designs	Ontario Designers
Underwood McLellan Ltd.	Alberta Designers
Underwood McLellan Ltd.	Saskatchewan Designers
UNIES Ltd.	Manitoba Designers
University of Calgary	Alberta Public Information
University of New Brunswick	New Brunswick Public Information
Vortek Industries Ltd.	British Columbia Manufacturers
Walmar	Ontario Manufacturers
Wardrop, W.L., & Assoc. Ltd.	Alberta and Manitoba Designers
Waterloo Research Institute	Ontario Research and Development
Watershed Energy Systems Ltd.	Ontario Manufacturers
Wax, Herbert L., & Assoc.	Québec Designers
Weibe, Forest, Tibbs Consultants Ltd.	Alberta Designers
Welch, Prof. J.D.	Manitoba Designers
Weldon Building Centre	Ontario Distributors
Wil Mechanical Ltd.	Alberta Installers
Wilson's Plumbing & Heating	Nova Scotia Installers
Wood, John, Ltd.	Ontario Manufacturers
Woodcroft Mechanical Contractors Ltd.	Ontario Installers
Wooden Ewe Ltd. (The)	Alberta Distributors
Wright, Gordon, Ltd.	Ontario Installers
Yang's Consultants Ltd.	Ontario Designers
Zedex Products Inc.	Ontario Manufacturers

Newfoundland

Designers

Island Energy Associates Ltd.
P.O. Box 4130
St. John's, Newfoundland
A1C 5Y2

Geoff Stiles
(709) 753-7321

Services: Engineers and technologists with experience in design and monitoring of alternative energy systems.

Projects: Monitoring and commissioning of active and passive systems for EMR and DHW packages for CMHC; management of solar greenhouse, Charlottetown.

Shawmont Newfoundland Ltd.
(see Installers)

Installers

Shawmont Newfoundland Ltd.
Box 9600
St. John's, Newfoundland
A1A 3C1

David Stewart
(709) 754-0250

Projects: EMR demonstration DHW.

Trans Island Mechanical Co. Ltd.
P.O. Box 252
Maple Valley Road
Cornerbrook, Newfoundland
A2H 6C9

Bernard Noseworthy
(709) 634-3382

Services: Mechanical contractors with experience in DHW installation. Union.

Projects: DHW, Cornerbrook office building.

Public Information

SESCI Newfoundland
% Geoffrey Stiles
P.O. Box 2
Site 76, R.R. 3
St. John's, Newfoundland
A1C 5H4

Nova Scotia

Designers

Adsett Engineering Ltd.
5991 Spring Garden Road
Halifax, Nova Scotia
B3H 1Y6

Ernie Adsett
(902) 429-5351

Services: Consulting engineers with experience in active system design.

Projects: Government building, St. Andrews.

Alternate Energy Consultants
P.O. Box 70
Porters Lake, Nova Scotia
B0J 2S0

Phil Thompson
(902) 829-2600

Services: Energy consultants with experience in active and passive design, retrofit analysis and social impact research.

Projects: Solarium Office; Bogan residence; Cambridge Station; 20 passive designs.

C.B.C.L. Ltd.
6100 Yonge Street
Halifax, Nova Scotia
B3K 5H4

A. Parker
(902) 455-7241

Services: Consulting engineers with experience in active system design and feasibility studies.

Projects: Lincoln Heights Apartment Building; Transit Garage; residential DHW and space heating systems.

Chebucto Engineering Ltd.
5991 Spring Garden Road
Suite 605
Halifax, Nova Scotia
B3H 1Y6

D. Warner (902) 429-5351

Services: Electrical designers with experience in DHW systems and feasibility studies.

Projects: 2 DHW, Cavendish, P.E.I.; Springhill, N.S.

Heliotrope Solar Enterprises Ltd.
5740 Atlantic Street
Halifax, Nova Scotia
B3H 1G9

J.C. Young
(902) 423-1722

Services: Engineers with experience in design and installation of DHW systems, and heat exchangers.

Projects: Several residential DHW and pool systems.

O Associates
Great Island, Medway Harbour
Queens County, Nova Scotia
B0J 2H0

W. Zimmerman
(902) 677-2993

Services: Designers with experience in DHW and feasibility studies.

Projects: Des Barres residence, P.E.I.; Eisenhauer residence, N.S.; Van Dyke residence, N.S.; Bedford Park, N.S.

G. Robert Parker Assoc.
P.O. Box 58
Armdale, Nova Scotia
B3L 4Z7

(902) 823-2375

Services: Architectural designers with experience in active air space heating and passive design.

Projects: Hopkins residence; 2 passive residences; Bedford Park Subdivision.

J.W. Rudderham Ltd. *(see Installers)*

Sol-Abode
R.R. 1
Elderbank, Nova Scotia
B0N 1K0

Peter Ripple
(902) 384-2867

Services: Designer and builder of passive solar residences.

Projects: several residences.

Designers, cont.

Soleast Energy Enterprises
45 College Street
Antigonish, Nova Scotia
B0H 1X0

(902) 863-1400

Services: Architectural and structural designers with experience in active system design and installation.

Projects: 5 pools; 6 DHW; 10 air systems.

Sperry Associates Ltd.
15 Victoria Road
Dartmouth, Nova Scotia
B2Y 2V5

John MacLennan
(902) 469-9000

Services: Architects with experience in active and passive design and feasibility studies.

Projects: 5 studies for Coast Guard facilities; studies for Northcliff and Dartmouth Recreation Centres.

Distributors and Dealers

Atlantic Solar Products Ltd.
P.O. Box 195
Guysborough, Nova Scotia
B0H 1G0

Mark Haynes
(902) 533-2835

Services: Distributors and installers of solar equipment. Manufacturers of "One Big Panel" DHW system.

Projects: 1 pool; 5 DHW; Guysborough greenhouse.

Energy Alternatives Ltd.
2 Croft Street
Box 671
Amherst, Nova Scotia
B4H 4B8

Stuart Lindsay
(902) 667-2790

Services: Distributors of components for site-assembled solar systems. Installation service.

Home Energy Audit Ltd.
653 George Street
Sydney, Nova Scotia
B1P 1LA

William MacDonald
(902) 539-5095

Services: Distributors and installers of Solartronics pool systems and Kerr DHW systems.

Projects: 4 pools; 1 DHW.

Sun Fuels Division
MacLeod & Grant Ltd.
251 Foord Street
Stellarton, Nova Scotia
B0K 1S0

W. Ross MacLeod
(902) 752-7522

Services: Distributors and installers of solar systems.

Projects: 7 pools; 2 DHW; solar furnace, Black Point; 3 Solaray 100% heating systems.

Installers

Atlantic Solar Products Ltd.
(see Distributors and Dealers)

Comstock
P.O. Box 604
Dartmouth, Nova Scotia
B2Y 3Y9

Richard Harrison
(902) 469-9244

Services: Mechanical and electrical contractors with experience in DHW installation.

Projects: Halifax Air Terminal.

Energy Alternatives Ltd.
(see Distributors and Dealers)

Heliotrope Solar Enterprises Ltd.
(see Designers)

Home Energy Audit Ltd.
(see Distributors and Dealers)

V. Rankin's Mechanical Contracting Ltd.
77 Prince Albert Road
Dartmouth, Nova Scotia
B2Y 1M1

Vernon Rankin
(902) 463-1055

Services: Mechanical contractors with experience in pool and air system installation.

Projects: 15 pools; 3 air systems.

J.W. Rudderham Ltd.
885 Victoria Road
Sydney, Nova Scotia
B1N 1K3

John Arsenault
(902) 539-6200

Services: Electrical and plumbing contractor with experience in solar system design and installation. Union.

Projects: 1 pool; 2 DHW; 1 air space system.

Soleast Energy Enterprises
(see Designers)

Steen Contractors Ltd.
9 Ralston Avenue
Dartmouth, Nova Scotia
B3B 1H6

A. Folk
(902) 463-6440

Services: Mechanical and electrical contractors with experience in installation.

Projects: Process hot water, Public Archives Building, Halifax.

Sun Fuels Division
(see Distributors and Dealers)

Sun Ross
P.O. Box 502
Port Hawkesbury, Nova Scotia
B0E 2V0

John Ross
(902) 625-1539

Services: Plumber and electrician with experience in DHW installation.

Projects: 1 DHW.

Wilson's Plumbing & Heating
177 Abercrombie Road
New Glasgow, Nova Scotia
B2H 1K5

John Wilson
(902) 752-0539

Services: Mechanical contractors.

Projects: 1 DHW, Pictou.

Public Information

SESCI Nova Scotia
P.O. Box 211
1815 Hollis Street
Halifax, Nova Scotia
B3J 2M4

Research and Development

Applied Science Assoc. Ltd.
P.O. Box 5141
Armdale, Nova Scotia
B3L 4M7

J.C. Young
(902) 423-1722

Services: Contract research in alternative energy particularly in chemical engineering fields.

IMA Aquatic Farming Ltd.
R.R 1
Glenwood, Nova Scotia
B0W 1W0

Brian H. Ives
(902) 643-2799

Services: Operation and evaluation of passive home, solar heated fish hatchery and greenhouse.

Projects: Various aquaculture research contracts with federal government.

Prince Edward Island

Designers

Allison & Sperry Ltd.
P.O. Box 370
Cornwall, Prince Edward Island
C0A 1H0

Drew Sperry
(902) 675-2391

Services: Architects and planners with experience in active system design.

Projects: Sunflower demonstration, Charlottetown; Cardigan Fish Hatchery; Mactaquac Fish Hatchery, N.B.; senior citizens' building, Charlottetown.

C.B.C.L. Ltd.
P.O. Box 1659
Charlottetown, Prince Edward Island
C1A 7N4

N. MacLaghlin
(902) 892-0303

Services: Consulting engineers with experience in active solar systems design and feasibility studies.

Projects: Fredericton Apartment Building; Dartmouth Transit Garage; residential DHW and space heating systems.

Renewable Energy Systems Ltd.
R.R. 1
Montague, Prince Edward Island
C0A 1R0

Richard Cox
(902) 962-3276

Services: Design and installation of attached greenhouses and "mud" heat storage for passive applications. Manufacturers of Tedlar double-skin glazing panels for attached solar greenhouses.

Projects: 2 commercial greenhouses, 1 with "mud" storage providing 100% heat required; greenhouse, Ark project; Cornwall Catholic Church; several residential attached greenhouses.

Solar Energy Systems Inc. *(see Distributors)*

Solsearch Inc.
P.O. Box 1869
Charlottetown, Prince Edward Island
C1A 7N5

D. Bergmark
O. Hammarlund
(902) 892-9898

Services: Architects and engineers specializing in active and passive design. "Conserver One", "Conserver Two" passive house CMHC approved plans.

Projects: Ark project; CFB Chatham; commercial solar greenhouse manual.

Distributors and Dealers

Solar Energy Systems Inc.
Stanley Bridge, Prince Edward Island
C0A 1E0

R.H. (Bob) Wygant
(902) 886-2655

Services: Distributor of Amherst products. Residential solar design and construction.

Projects: 6 pools; 21 air systems.

Installers

Central Construction Ltd.
P.O. Box 89
Montague, Prince Edward Island
C0A 1R0

Lowell Boehner
(902) 838-2989

Services: Construction contractors with experience in pool and DHW installation.

Projects: 2 pools; 20 DHW, Institute of Man and Resources.

Ford Electric Ltd.
70 Newland Crescent
Charlottetown, Prince Edward Island
C1A 4H7

J. Barlow
(902) 894-3807

Services: Electrical contractors with experience in DHW and air system installation. Union.

Projects: 1 DHW, Des Brisay House; 1 air system; 4 installations, Halifax.

Gaudet's Electrical Service
P.O. Box 75
Tignish, Prince Edward Island
C0B 2B0

Leo Gaudet
(902) 882-2385

Services: Electrical and plumbing contractors with experience in DHW installation.

Projects: 4 residential DHW.

Hume & McLean Ltd.
13 Main Street
Montague, Prince Edward Island
C0A 1R0

David MacLean
(902) 838-2228

Services: Mechanical contractor with experience in DHW installation.

Projects: 5 DHW.

Inman Plumbing & Heating Ltd.
P.O. Box 1658
Summerside, Prince Edward Island
C1N 2V5

Clarence Doyle
(902) 436-2253

Services: Plumbers with experience in DHW installation. Union.

Projects: 5 DHW including Pro Shop, Cavendish; Westisle School, Elmsdale; Greenfield School, St. Eleanor's.

Manufacturers

Renewable Energy Systems Ltd.
(see Designers)

Public Information

Institute of Man and Resources
(see Research and Development)

Solsearch Inc.
(see Designers)

Souris Energy Council
P.O. Box 365
Souris, Prince Edward Island
C0A 2B0

Judi Rose
(902) 687-3030

Services: Community centre distributing information on renewable energy topics.

Research and Development

Institute of Man and Resources
50 Water Street, Box 2008
Charlottetown, P.E.I.
C1A 1A4

C. Kirk Brown
(902) 892-0361

Services: Research into renewable energy resources; information and education on energy issues.

Projects: Design and demonstration of DHW systems; Desbarres Apartments, air system with rock storage.

New Brunswick

Designers

A.D.I. Ltd.
P.O. Box 44
Fredericton, New Brunswick
E3B 4Y2

D.E. Gorman
(506) 454-4491

Services: Consulting engineers with experience in air system design and feasibility studies.

Projects: Desjardins residence, Fredericton.

Adsett & Assoc. Ltd.
9 Robinson Drive
Fredericton, New Brunswick
E0H 1N0

Ernest Adsett
(506) 363-4244

Services: Consulting engineers with experience in active design.

Projects: 1 pool; 2 DHW; 3 process hot water; 6 air systems; St. Andrews Biological Station; Cardigan Fish Culture Station.

Jean-Claude Bellivsau
P.O. Box 21
Shediac, New Brunswick
E0A 3G0

(506) 384-4406

Services: Design consultant.

Projects: DHW, Nursing Home, Shediac.

C.B.C.L. Ltd.
P.O. Box 6044
Station A
Saint John, New Brunswick
E2L 2R5

F. Holden
(506) 642-7032

Services: Consulting engineers with experience in active system design and feasibility studies.

Projects: Fredericton apartment building; Dartmouth Transit Garage.

Energeave Systems Ltd.
P.O. Box 187
Oromocto, New Brunswick
E2V 2G5

David Libby
(506) 357-3397

Services: Designers of air space heating systems.

Projects: 4 air systems; DSS building, Fredericton.

Enerplan Consultants Ltd.
188 Gordon Street
Moncton, New Brunswick
E1C 1N2

G.R. Hoadley
(506) 854-5536

Services: Engineers with experience in active and passive design.

Projects: DHW systems; Lakefield Elementary School, Quispamsis; Boulevard Plaza Phase II, Moncton

Lowenuse Housing Developments Ltd.
Box 940
Rothesay, New Brunswick
E0G 2W0

John K. Large
(506) 847-7573

Services: Designers and builders specializing in passive design.

Projects: 4 passive residences.

Parsons Construction Co.
P.O. Box 369
Moncton, New Brunswick
E1C 8L4

Jay Parsons
(506) 855-2050

Services: Civil engineers and structural contractors offering residential energy conservation consultation.

Projects: NBEPC Building, Shediac; 2 buildings, Sackville.

Distributors and Dealers

Alternate Heating Ltd.
621 Rothesay Avenue
Saint John, New Brunswick
E2H 2G9

Don Hemmings
(506) 696-2321

Services: Distributors of Solartronics pool systems, CES air-to-air heat exchangers, components for pool and DHW systems, solar greenhouse and passive components. Installation service.

Projects: 5 pools; 8 DHW; 100 greenhouses.

Installers

Alternate Heating Ltd.
(see Distributors and Dealers)

Apex Machine Works Ltd.
Box 582
Moncton, New Brunswick
E1C 8M6

Allan Ayles
(506) 388-4088

Services: Manufacturers and installers of solar storage tanks.

Projects: New Brunswick Power Commission Building, Shediac.

E.W. Clowater & Sons Ltd.
288 Union Street
Fredericton, New Brunswick
E3A 3L9

C. Wesley Clowater
(506) 472-9892

Services: Mechanical contractor with experience in DHW and air system installation.

Projects: 2 DHW; 4 air space systems; Ireton residence.

Hagerman's Mechanical Contractors Ltd.
Box 423, 389 Argyle Street
Fredericton, New Brunswick
E3B 4Z9

Robert N. Hughes
(506) 455-3263

Services: Plumbing and heating contractors. Union.

Projects: 1 DHW.

David Kantor
R.R. 1
Codys, New Brunswick
E0E 1E0

David Kantor
(506) 488-2845

Services: Builder of energy-efficient houses with experience in installation of air space heating solar systems.

M & H Mechanical Ltd.
P.O. Box 1573
Fredericton, New Brunswick
E3B 5G2

G. MacNabb
(506) 454-4321

Services: Plumbers with experience in DHW installation. Union.

Projects: DHW for 12-unit apartment.

Moncton Plumbing & Supply Co. Ltd
141 Halifax Street
Moncton, New Brunswick

Jules A. LeBlanc
(506) 854-4396

Services: Plumbers with experience in solar installation. Union.

Projects: 1 DHW, 3 air space heating systems; process hot water, Plaza II.

Public Information

City of Fredericton
P.O. Box 130, City Hall
Fredericton, New Brunswick
E3B 4Y7

Energy Coordinator
(506) 455-9426

Services: Initiate and facilitate community-based energy programs. Organize and sponsor educational sessions relative to energy concerns.

Projects: Community Energy Index; recycling program; recycling handbook; data base development.

SESCI New Brunswick
% Tom Gallagher
P.O. Box 114, Station A
Fredericton, New Brunswick
E3B 5C6

University of New Brunswick
Dept. of Mechanical Engineering
P.O. Box 4400
Fredericton, New Brunswick
E3B 5A3

Verne Ireton
(506) 453-4513

Services: Solar consulting; extension courses on solar energy.

Projects: Shediac office of NBEPC; DHW installation and monitoring; Nasonworth passive residence.

Designers

S. Albert & Co. Ltd.
(see Installers)

Angers, Drouin, Simard & Assoc.
3555 Boulevard Hamel Ouest
Québec, Québec
G2E 2G6

Hugues Dery
(418) 872-6110

Services: Consulting engineers offering active and passive solar system design and energy conservation analysis.

Projects: Village Huron School, Québec; Veteran's Hospital, Montréal; Executive Training Centre, Tourraine; Institutional hot water systems.

Belzile, Brassard, Gallienne, Lavoie, Architects
477 Boulevard Champlain
Québec, Québec
G1K 4J4

Michel Dallaire
(418) 524-3593

Services: Architects with experience in active and passive solar system design and consultants on energy conservation.

Projects: Croteau residence, St-Antoine-de-Tilly; 2 solar residences; 1 passive office building; 2 air systems.

David Boardman Architect
10 Des Rivières
Sainte-Foy, Québec
G2G 1B4

J. Boardman
(418) 872-4552

Services: Architect with experience in active system and energy-efficient design.

Projects: Air system solar residence, Ste-Foy; passive apartment building, Pte-Ste-Claire; 10 pool systems.

Bolduc, Gervais, Déry Architects
839 Cascades, Ch.201
C.P. 303
Shawinigan, Québec
G9N 1V1

Rolland Gervais
(819) 537-1814

Services: Architects with experience in design of air systems.

Projects: Shawinigan residence.

Bolé Inc. (Groupe Somec)
(see Installers)

Bumaylle, Marquis, Laporte, Cloutier et Associés
1570 Chabanel Ouest
Montréal, Québec
H4N 1H4

Robert N. Cloutier
(514) 389-8438

Services: Consulting engineers specializing in energy conservation systems including heat pumps, heat recovery storage tanks.

Projects: Union Régionale des Caisses Desjardins, Joliette

Yvan Couillard
10, 3rd Avenue
Rimouski Est, Québec
G5L 2N6

Yvan Couillard
(418) 723-6645

Services: Designer with experience in active solar design.

Projects: Bergeron residence, Rimouski.

Michel Dallaire
859 Avenue Mgr Grandin
Suite 5
Ste-Foy, Québec
G1V 3X8

Michel Dallaire
(418) 651-7994

Services: Architect with experience in active and passive solar design. Consultant on energy conservation.

Projects: 3 residences; 1 passive office building.

Michel Dufresne
138 Price Ouest
Chicoutimi, Québec
G7J 1G8

Michel Dufresne
(418) 543-4960

Services: Consulting engineer with experience in active solar system design and feasibility studies.

Projects: Pool and air system installations in Chicoutimi.

Dynamique Design, WDL
C.P. 631
Hauteville, Québec
G1S 1J2

David Leslie
(418) 683-5427

Services: Architects specializing in energy-efficient and passive solar design.

Econergie Ltée.
373 Rue St-Paul Ouest
Montréal, Québec
H2Y 2A7

Roland Hakim
(514) 288-2851

Services: Engineers and contractors with experience in active solar system design. Specializing in energy management in commercial and institutional buildings.

Projects: Polyvalent Paul Emile Arseneau, Assomption.

Hélio-Conseil Inc.
3566 De Bullion
Montréal, Québec
H2X 2Z9

Claude Bellemare
(514) 737-7493

Services: Consulting engineers and architects, specialists in solar design.

Projects: Four-storey solarium, downtown Montreal.

Le Group E +
1434 Ste-Catherine Ouest
Suite 502
Montréal, Québec
H3G 1R4

N.N. Doan
(514) 861-1407

Services: Consulting engineers with experience in active system design.

Projects: The Federal Building, Montréal; CN Yard, Tachereau; Public Archives, Halifax; Metro Transit, Halifax.

J.M. Lagacé et Associés
2900 C. des Quatre Bourgeois
Ste-Foy, Québec
G1V 1Y4

André Boulanger
(418) 653-5201

Services: Consulting engineers, pool system design.

Projects: 1 pool system.

Letendresse, Demers & Associés
150 Nord, Rue Vimy
Suite 401
Sherbrooke, Québec
J1J 3M7

Jacques Thibeault
(819) 562-3876

Services: Consulting engineers with experience in active solar system design.

Projects: 1 DHW; 1 air system.

G.R. Murfitt & Associate
36 Hemlock Street
Aylmer, Québec
J9H 3T9

G.R. Murfitt
(819) 684-3560

Services: Architects specializing in passive solar design including attached greenhouses.

Projects: Several private residences including one underground house and a houseboat; Café le Potager.

Designers, cont.

Claude Parisel
9 Avenue Querbes
Outremont, Québec
H2V 3V7

Claude Parisel
(514) 270-5472

Services: Professor of architecture at University of Montréal, specializing in passive building design, and educational materials.

Projects: Begin residence, Québec; Quatre Vents residence, St. Damiens.

Retro Excavation Inc.
35 Place des Roches
Stoneham, Québec
G0A 4P0

Raymond Parent
(418) 849-2911

Services: Designers of DHW and pool systems and feasibility studies.

Projects: Parent residence, pool and DHW.

Charles Ross, Architect
304 Est, St-Germain
Rimouski, Québec
G5L 1B9

Charles Ross
(418) 722-7655

Services: Architect specializing in energy-efficient buildings and the integration of active and passive systems.

Projects: A condominium complex; Hotel de Ville, Notre-Dame-du-Lac; Hydro Québec Building, Rimouski; TV station and many private residences in Rimouski area.

Norman Slater, Architect
4845 Sherbrooke Street W.
Montréal, Québec
H3Z 1G6

Norman Slater
(514) 932-4164

Services: Architect specializing in conservation and renewable energy systems. Experienced in active and passive design.

Projects: Rideau Falls Renewable Energy Exhibit, Ottawa; Protol Inc., Montréal.

SOMEC Inc.
(see Installers)

Techni-Solaire Ltée.
(see Installers)

Herbert L. Wax & Associates
8375 Bougainville Street
Montréal, Québec
H4P 2G5

Herbert L. Wax
(514) 694-2512

Services: Consulting engineers with experience in DHW and process hot water system design and feasibility studies.

Projects: Lachute apartment building; 3 DHW; 3 process hot water.

Distributors and Dealers

CBI Inc.
21, rue Montcalm
Lévis, Québec
G6V 6N6

Guy Begin
(418) 837-8863

Services: Distributors of insulating shutters.

Chauffage Solaire Inc.
(see Installers)

Matériaux L.B.S. Inc.
147, rue Queen
Lennoxville, Québec
J1M 1J7

Pat Ball
(819) 567-4874

Services: Distribution of active and passive solar products.

SCP Solar Division
Seigniory Chemical Products Ltd.
777, rue Lajoie
Dorval, Québec
H9P 1G7

George Feilders
(514) 631-1421

Services: Supply of pool systems and pool covers for residential and community pools.

Installers

S. Albert & Co. Ltd.
5763 St. Lawrence Blvd.
Montréal, Québec
H2T 1T2

Ivan Spector
(514) 273-6361

Services: Installation and design of active solar systems. Conservation consultation.

Projects: 4 pools; 2 DHW; 1 process hot water.

Black & McDonald Ltd.
915 Montée de Liesse
Montréal, Québec
H4T 1R2

V. Thorose
(514) 735-6671

Services: Mechanical contractors with experience in DHW installation.

Projects: Air Canada Building, Dorval.

Bolé Inc.
240 Rue Lachance
Québec, Québec
G1P 2H3

André Delisle
(418) 683-2281

Services: Electrical and structural engineers with experience in solar installation. Union.

Projects: 2 DHW; 2 air space systems; CEGEP Limoilou, Québec; Kinsmen House, Québec.

Capto Solar 2000 Inc.
15, St. Joseph
Vaudreuil, Québec
J7V 6Y9

Réjean Boyer
(514) 455-7366

Services: Installers of pool systems and Trombe walls.

Chauffage Solaire (R.A.) Inc.
725 La Salle
Ste-Marie, Québec
G0S 2Y0

Rosaire Auger
(418) 387-3182

Services: Installers and distributors of active solar systems.

Projects: 6 pools; 2 air space systems; O.T.J., Ste-Marie; Ste-Marie Express.

La Chaufferie Inc.
372 47e Rue Ouest
Québec, Québec
G1H 5H4

Eugene Derome
(418) 626-1411

Services: Mechanical contractors.

Projects: 1 pool.

Chouinard & Fils Ltée
131 Jean Proulx
Parc Industriel
Hull, Québec
J8Z 1T4

Guy Chouinard
(819) 778-1112

Services: Plumbing and heating contractor.

Projects: PUSH DHW, Gatineau, Québec.

Climabel Inc.
182 Carpentier
St-Mathieu-de-Beloeil, Québec
J3G 4S5

René Perreault
(514) 467-7971

Services: Plumbing and heating contractors with experience in pool system installation. Union.

Projects: Pepin and Choquette pools, Beloeil.

Climatisation Maniwaki, Inc.
133 King
Maniwaki, Québec
J9E 2L2

Marc Vaillancourt
(819) 449-3750

Services: Plumbing and heating contractors. Union.

Projects: 2 pools, Maniwaki.

Marc Dufresne Inc.
3175, rue Notre-Dame
Trois-Rivières, Québec
G9A 4Y7

Marc Dufresne
(819) 373-4142

Services: Plumbing and heating contractors. Suppliers and installers of pool systems.

Projects: 6 pools.

Installers, cont.

Enertech
8176 Boul. Champlain
Suite 200
LaSalle, Québec
H8P 1B4

R. Mischoak
(514) 367-0266

Services: Installers of pool systems.

Projects: 1 pool.

Métalbec Ltée
5573 Chemin de l'aeroport
C.P. 580
Valcourt, Québec
J0E 2L0

Jean-Guy Robichaud
(514) 532-3422

Services: Installers of pool systems.

Projects: 4 pools.

Petro-Sun Inc.
(see Manufacturers)

Plomberie Y. Beaudoin Inc.
1387 de la Sapinière
C.P. 728
St-Rédempteur (Cté Lévis),
Québec
G0S 3B0

Yvon Beaudoin
(418) 831-3152

Services: Plumbers with experience in pool installation.

Projects: 15 pools.

Plomberie A. Girard Ltée
C.P. 937, 12 St-Jean Baptiste
Ville-Marie, Québec
J0Z 3W0

Jean G. Girard
(819) 629-2859

Services: Plumber with experience in pool system installation. Union.

Projects: 2 pools.

Plomberie Narbonne & Fils
114 Côte St-Paul
St-Colomban, Québec
J0B 1N0

André Narbonne
(514) 436-9476

Services: Plumbing and heating contractors.

Projects: 1 air space system, Lachute.

Plomberie St. Pie X
398 des Hirondelles
Rimouski, Québec
G5L 8C8

Serge Desjardins
(418) 724-4816

Services: Plumbers and installers of solar systems. Union.

Projects: 1 air space heating system; Lulumco sawmill, Luceville.

Plomberie Sol-Air-Eau du Bas St-Laurent Inc.
C.P. 997
Rimouski, Québec
G5L 7E1

Emilien Bergeron
(418) 723-4390

Services: Plumbers and installers of solar systems. Union.

Projects: 1 pool; 1 DHW; 1 process hot water system.

Poly Réfrigération Inc.
10826 Place Moisan
Montréal, Québec
H1G 4N7

C.J. LaBoissière
(514) 321-0542

Services: Mechanical contractors with experience in solar installation. Union.

Projects: 1 pool; 2 DHW; 4 process hot water; 2 air space systems.

Emil Séguin & Fils Ltée
144, rue Eddy
Hull, Québec
J8X 2W8

François Séguin
(819) 777-5854

Services: Plumbing, heating, and ventilation contractor.

Projects: PUSH DHW, Touraine Training Centre, Québec.

Ovide Séguin Ltée
171, Boulevard St-Joseph
Hull, Québec
J8Y 3X1

Michel Séguin
(819) 777-8728

Services: Plumbing and heating contractors. Union.

Projects: Turpin pool, Luskville.

Solaire B.F.G. Ltée
1871 St-Louis
Saint-Laurent, Québec
H4M 1N5

C. Ferraro

Services: Plumbing and heating contractors with experience in solar installation.

Somec Inc.
1755 rue Alain
Duberger, Québec
G1N 3Z8

Jacques R. Coté
(418) 687-1640

Services: Plumbing and heating contractors with experience in solar installation. Union.

Projects: 2 DHW; 2 air space systems; Mirabel Airport; Hotel de Ville, Notre Dame du Lac; CEGEP de Limoulou; Maison Kingsmen.

Sunarc Products Inc.
1420 Hymus Boulevard
Dorval, Québec
H9P 1J6

Richard Polewczuk
(514) 683-5278

Services: Master plumber with wide experience in commercial and residential solar installation. Union. Instructor for CSIA DHW installation course.

Projects: Air Canada Building, Dorval; process water, Gaza Products Inc., Montréal; CNR train washing facility, Montréal.

Techni-Solaire Ltée
C.P. 1127
St-Sauveur-des-Monts, Québec
J0R 1R0

M.E. Bendit
(514) 227-5023

Services: Designers and installers of active systems.

Projects: 260 pools; 25 DHW; 3 process hot water; 6 air systems.

Manufacturers

Fibratech Inc.
5350 - 13 Ave. Rosemont
Montréal, Québec
H1X 2X8

Pierre Boisvert
(514) 727-5955

Services: Manufacturer of liquid and freon collectors, heat exchangers, programmable solar controllers and monitoring equipment.

Magnus Chemicals Ltd.
190 Boulevard Industriel
Boucherville, Québec
J4B 2X3

Roger A. Gamache
(514) 655-1344

Services: Manufacturer of Aquasol 60NT collector fluid.

Petro-Sun Inc.
2290 de la Métropole
Longueuil, Québec
J4G 1E6

(514) 670-8043

Services: Manufacturer of Thermo Solar liquid flat plate collectors and DHW systems, pool collectors and control modules. Distributors of solar desalination plants, tracking photovoltaic collectors, solar irrigation pumps and solar cooling pumps. System design and installation.

Projects: Air Canada Terminal, Dorval; CN yard, Montréal; Gare Maritime, Ste-Foy; St. Hubert Barracks; Waterton and Jasper Park pools.

Silonex Inc.
2150 Ward Street
Montréal, Québec
H4M 1T7

M. Pawlowski
(514) 744-5507

Services: Manufacturers of photovoltaic cells and panels.

Projects: Canadian Coast Guard; Jet Propulsion Labs; Ontario Hydro; NRC.

Solarmec Ltée
386 Boulevard Harvey
Jonquière, Québec
G7X 3A2

Claude McLean
(418) 547-8551

Services: Manufacturer and distributor of pool blanket roller; sales and installation of solar pool heating systems.

Public Information

Brace Research Institute
(see Research and Development)

MACEM
C.P. 305, Succursale Postale
Outremont, Québec
H2V 4N1

Geneviève Labelle
(514) 271-7650

Services: Bibliography and directory of renewable energy information and resources.

Nick Nicholson
Walker Road, Box 344
Ayer's Cliff, Québec
J0B 1C0

Nick Nicholson
(819) 838-4871

Services: Solar consultant, author of solar books and manuals.

Claude Parisel
(see Designers)

SESCI Québec
Ecole Polytechnique
C.P. 6079, Succursale A
Montréal, Québec
H3C 3A7

Research and Development

Coreco Inc.
280 Victoria Avenue
Longueuil, Québec
J4H 2J6

Daniel Crevier
(514) 651-2919

Services: Design, construction and research in salt gradient solar ponds.

Brace Research Institute
McDonald College
McGill University
Ste-Anne-de-Bellevue, Québec
H0A 1C0

Tom Lawand
(514) 457-6580

Services: Research in solar and wind energy, solar desalination systems and greenhouse design. Publications on renewable energy topics.

INRS-ENERGIE
1650 Montée Ste-Julie
Varennes, Québec
J0L 2P0

Fernand Rheault
(514) 652-9836

Services: Collector testing, solar component research and development, information and econometric studies.

Projects: Seasonal storage monitoring project, deep well storage, flat plate collector.

Solargetics Ltd.
5767 Plantagenet St.
Montréal, Québec
H3S 2K4

C. Marsolais
(514) 739-8320

Services: Research and development of renewable energy technologies.

Designers

ABRICO Energy Management Services Ltd.
P.O. Box 1090
Lakefield, Ontario
K0L 2H0

Kim Krenz
(705) 652-8447

Services: Energy management consultants with experience in solar monitoring.

Projects: 24 NRC monitoring projects; Convent Glen, Ottawa; Lakefield District P.O.

Acres Consulting Services Ltd.
5259 Dorchester Road
Niagara Falls, Ontario
L2E 6W1

D.L.R. Cronin
(416) 354-3831

Services: Consulting engineers and scientists with research laboratory facilities. Experienced in passive design, instrumentation, monitoring and research studies.

Projects: Applewood School, St. Catharines; in-ground heat storage study; B.C. solar market study; LEBDA design award.

Advanced Idea Mechanics Ltd.
26 Ski Valley Crescent
London, Ontario
N6K 3H3

Paul Corfield
(519) 471-5573

Services: Computer-assisted passive design of indoor pools and residences. Distributors of Mitsubishi air-to-air heat exchangers.

Allen-Drerup-White Ltd.
334 King Street E.
Studio 505
Toronto, Ontario
M5A 1K8

L. Frith
(416) 863-1762

Services: Engineers, designers, and builders specializing in custom-built energy-efficient housing. Experienced in design, construction and monitoring of active and passive systems.

Projects: Keewatin demonstration houses, Jesuit Community Centre, Espanola; 40 passive, energy-efficient residences; 1 residential air system; feasibility studies.

H.H. Angus & Assoc. Ltd.
1127 Leslie Street
Don Mills, Ontario
M3C 2J6

H.G. Angus
(416) 449-5050

Services: Consulting engineers with experience in active system design and feasibility studies.

Projects: Ryerson demonstration; George Brown College demonstration; Brampton Correctional Institute.

Atkinson & Assoc. Ltd.
385 The West Mall, Suite 250
Etobicoke, Ontario
M9C 1E7

John Atkinson
(416) 626-1047

Services: Engineers with experience in active and passive system design and feasibility studies.

Projects: Newmarket Court House; Applewood School; Globe & Mail building, Toronto; Aylmer Senior Citizens' Apartment; Sherbrooke office building, Québec (LEBDA design award); Black Creek Pioneer Village; Postal Delivery Building, Toronto; marketing studies.

BFH Shawinigan Engineering Inc.
300-130 Slater Street
Ottawa, Ontario
K2P 5H6

Les Jones
(613) 236-0438

Services: Consulting engineers with experience in energy audits, computeranalysis, energy management, DHW design and feasibility studies.

Projects: DHW, Animal Diseases Research Institute; feasibility study for solar-assisted heat pump, Central Government Printing Bureau.

Boigon & Armstrong Architects
61 Curlew Drive
Don Mills, Ontario
M3A 2P8

I.D. Boignon (416) 445-6840

Services: Architects with experience in air space heating DHW design and feasibility studies.

Projects: Courthouse & Registry Office, Newmarket; Community Centre/Branch Library, Toronto.

Denis Bowman
King Summit, R.R. 1
King, Ontario
L0G 1K0

Denis Bowman
(416) 833-5402

Services: Architect-planner, passive solar design.

Projects: Several in-ground and other residential passive systems.

E.R. Broughton Assoc. Ltd.
199 Blythwood Road
Toronto, Ontario
M4N 1A5

Eric Broughton
(416) 487-8474

Services: Consulting engineers with experience in DHW system design and feasibility studies.

Projects: Aberfoyle Fisheries Aquaculture Plant.

Candaplan Group Inc.
(see Installers)

Cairenius Markus Architect & Planner
36 Queen Street E.
Suite 205
Brampton, Ontario
L6V 1A2

R.M.J. Cairenius
(416) 453-6742

Services: Architect with experience in active and passive design.

Projects: Test facility, Markham; Simola residence, Downsview; Villa Lehikoinen, Parry Sound.

Howard D. Chapman, Howard V. Walker Architects
416 Moore Avenue
Toronto, Ontario
M4G 1C9

Howard V. Walker
(416) 425-1223

Services: Architects with experience in active and passive design. Energy related conferences, workshops and books.

Projects: Vaughan passive residence; Gravenhurst passive office building; DHW, Toronto apartment building; DHW, Peterborough residence. Process hot water, Globe and Mail Building, Toronto.

Chorley & Bisset Ltd.
521 Colborne Street
London, Ontario
N6B 2T6

Peter J. Golem
(519) 679-8660

Services: Consulting engineers with experience in active system design, monitoring and feasibility studies.

Projects: Halifax Archives Building; CFB London; monitoring of PASEM program; PUSH feasibility studies.

Designers, cont.

Clemann, Large, Patterson & Assoc.
1770 Courtwood Crescent
Ottawa, Ontario
K2C 2B5

Marc Clemann
(613) 224-8090

Services: Consulting mechanical engineers with experience in active system design.

Projects: Nepean Sportsplex; Nepean Police Station; Lebreton Flats row housing; PBX Building, Ottawa; Khair residence, Ottawa; 2 pool, 12 DHW.

Conserval Engineering Inc.
855 Alenes Street
Downsview, Ontario
M3J 2H8

John Hollick
(416) 661-7057

Services: Engineers experienced in design of low-cost do-it-yourself heating systems. Manufacturers and distributors of components for space, water, greenhouse and pool heating systems.

Projects: Bell Canada, Fergus; W.R. Draper Co., Toronto; Photoprocessing Lab., Bermuda; many residential space and DHW systems.

Davis Engineering Ltd.
1481 Cyrville Road
Ottawa, Ontario
K1B 3L7

Roland Davis (613) 746-3760

Services: Consulting engineers with experience in design, installation, and feasibility studies. Research, computer simulation, product development.

Projects: Minto solar-assisted heat pump, Ottawa; Ottawa Athletic Club; residential DHW.

DFA Engineering Ltd.
450 Front Street West
Toronto, Ontario
M5V 1B6

W.D. Aitken
(416) 961-4151

Services: Consulting engineers and architects with experience in design and monitoring of DHW systems.

Projects: West Humber Collegiate, Etobicoke; Warden's Building, Pelee Park (heat pump); Collins Bay Penitentiary; Men's mess, Camp Borden.

The ECE Group
205 Lesmill Road
Don Mills, Ontario
M3B 2V1

Jack Chisvin
(416) 449-1030

Services: Consulting engineers with experience in liquid solar system design, feasibility studies and monitoring.

Projects: Toronto International Airport, Administration Building; Simpson's; Canadiarl Forces Base, Downsview; Fairview Mall; C.P. Air; Provident House; Aylmer residence.

Energy North International Ltd.
P.O. Box 8466
Ottawa, Ontario
K1G 3H9

Jay Jayaraman
(613) 731-1084

Services: Designers and installers of active systems. Development of specialized solar components. Distributors of Koolshade window insulation.

Projects: 2 DHW; 1 liquid system; 2 monitoring projects.

Enermodal Engineering Ltd.
421 King Street N.
Waterloo, Ontario
N2J 4E4

Stephen Carpenter
(519) 884-6421

Services: Consulting engineers specializing in computer simulation of active and passive systems.

Projects: Computer models for several companies. 3 pools; 8 DHW.

Engineering Interface Ltd.
2 Sheppard Avenue E.
Suite 200
Willowdale, Ontario
M2N 5Y7

Tom Tamblyn
(416) 226-6565

Services: Engineers offering computer simulation analysis, energy management and conceptual design.

Projects: Ontario Hydro Thermal Training Centre; Joseph P. Shepard Building.

Environmental Engineering Consultants Ltd.
43 Eccles Street
Ottawa, Ontario
K1R 6S3

R. Ian Clapperton
(613) 232-7982

Services: Consulting engineers with experience in active and passive design.

Projects: Trinity Presbyterian Church, Kanata; Governor General's greenhouse, Rideau Hall.

First Co-operative Solar Co. Ltd.
R.R. 2
Peterborough, Ontario
K9J 6X3

Ernie Jenkins
(705) 745-9480

Services: Consumer/producer cooperative offering design and installation services to members and products developed by members.

Projects: Site-assembled DHW and air systems.

Fodor Engineering Ltd.
111 Avenue Road
Toronto, Ontario
M5R 3L7

W.J. Doncaster
(416) 924-7401

Services: Consulting engineers with experience in active solar system design.

Projects: Scarborough Courthouse; DeHavilland Aircraft of Canada; 1 Front Street, Toronto; Dryden Activity Complex.

Fodor Engineering Ltd.
273 Third Avenue
Suite 303
Timmins, Ontario P4N 1E2

Peter L. Cook
(705) 267-1738

Services: Consulting engineers with experience in pool system design and feasibility studies.

Projects: Dryden Activity Complex.

Peter Fluker Design
P.O. Box 994
Orillia, Ontario
L3V 6K8

Peter Fluker
(705) 487-5920

Services: Designer with experience in passive solar design and construction.

Projects: Brown residence, Orillia; McNeil residence, Lake Dalryple; Milton residence, Stagner; Thompson-Jago residence, Orillia; Kelsch greenhouse, Schomberg.

General Solar Inc.
Box 281
99 Bruce Crescent
Carleton Place, Ontario
K7C 3T3

(613) 257-7021

Services: Designers with experience in active system design, installation, feasibility studies and monitoring.

Projects: Richvale Community Centre Pool; Conference Centre, Ottawa; 50 pools; 1 DHW; 1 process hot water system.

Giffels Associates Ltd.
30 International Boulevard
Rexdale, Ontario
M9W 5P3

E. Hoel
(416) 675-5950

Services: Consulting engineers with experience in active solar system design and feasibility studies.

Projects: Mohawk Hospital Services, Hamilton; Public Works Canada; Ontario Ministry of Housing; Ontario Ministry of Health.

Goodkey Weedmark & Assoc. Ltd.
130 Albert Street
Suite 1901
Ottawa, Ontario
K1P 5G4

G. W. Goodkey
(613) 232-7101

Services: Consulting engineers with experience in DHW system design and feasibility studies.

Projects: Children's Hospital of Eastern Ontario.

Designers, cont.

Bruce D. Gough & Assoc.
53 Queen Street
Studio 21
Ottawa, Ontario
K1P 5C5

Bruce Gough
(613) 232-5393

Services: Architects specializing in passive design, thermal performance analysis, and theoretical studies.

Projects: Trinity Presbyterian Church, Kanata; Charbonneau residence, Luskville, Qué.; Coté residence, Kirks Ferry, Qué.; studies, surveys and monitoring projects for EMR, NRC, CMHC.

Gugula, Smedley & Babin
123 East Street
Sault Ste Marie, Ontario
P6A 3C7

(705) 254-1402

Services: Consulting engineers and architects.

Projects: PUSH, DHW.

John Hix Architects
511 Bloor Street W.
Toronto, Ontario
M5S 1Y4

John Hix
(416) 533-8529

Services: Architects with experience in active and passive design and feasibility studies. Books and double envelope house plans.

Projects: 40 solar designs for residences and commercial buildings; LEBDA prize for office buildings in Québec and Saskatchewan; Provident House.

Hooper & Angus Assoc. Ltd.
950 Yonge Street
Suite 502
Toronto, Ontario
M4W 2J7

Stuart Angus
(416) 961-4151

Services: Consulting engineers with experience in active solar system design and solar product development.

Projects: Provident House, Aylmer Senior Citizens' Residence. Wallace Emmerson Community Centre; numerous other projects.

Interplan Ltd.
170 Donway West
Don Mills, Ontario
M3C 2G3

J.W. Dick
(416) 447-9146

Services: Designers with experience in DHW system design and feasibility studies.

Projects: Vaughan Municipal Building; Mackenzie Building, Toronto.

Kerr Builder
R.R. 3
Dalkeith, Ontario
K0B 1E0

Richard Kerr
(613) 874-2293

Services: Designer and builder of solar additions, specializing in solar greenhouses.

Projects: 10 additions.

Kingston Solar Systems Ltd.
1085 Princess Street
Kingston, Ontario
K7L 1H3

Donald Sleeth
(613) 549-4040

Services: Design, installation and maintenance of active solar systems.

Projects: Residential air system; NRC process hot water system.

Lea, Elken, Becksted, Fair, Architects
3 Church Street
Toronto, Ontario
M5E 1M2

R.W. Becksted
(416) 364-9458

Services: Architects with experience in active and passive design.

Projects: Meadowvale residence; Campus office building, Mississauga.

Timothy Mayo, B. Arch.
Box 20, R.R. 1
Osgoode, Ontario
K0A 2W0

Timothy Mayo
(613) 821-1825

Services: Graduate architect with experience in passive solar and energy-efficient design and construction. Conservation consultant.

Projects: 3 passive residences.

D.E. McGregor and Assoc. Ltd.
1295 Bellamy Road N.
Scarborough, Ontario
M1H 1H9

L.M. Bennett
(416) 438-9725

Services: Electrical contractor with experience in air system design.

Projects: Watson residence, Penetanguishene.

McKee, Lockhart & Assoc. Ltd.
1300 Carling Avenue
Suite 307
Ottawa, Ontario
K1Z 7L2

R.J. McKee
(613) 725-2039

Services: Design consultants with experience in process hot water and air systems.

Projects: La Promenade Building, Ottawa; National Police Services Building; Exhibition Commission warehouse; Exhibition Commission offices; 2 Ottawa residences.

Mechanical Consultants Western Ltd.
264 King Street W.
4th Floor
Toronto, Ontario
M5V 1J2

G.C. Bellamy
(416) 598-2920

Services: Consulting engineers, designers of mechanical and electrical systems.

Projects: Meadowvale demonstration house; Steel residence, Mount Forest; Wekard water heating plant.

Gord Meuser Design
R.R. 3
Wheatley, Ontario
N0P 2P0

Gord Meuser
(519) 825-4630

Services: Architectural technologist and builder of energy-efficient homes, with experience in active and passive design.

Projects: Several residences in Wheatley and Learnington.

The Mitchell Partnership Ltd.
59 Mobile Drive
Toronto, Ontario
M4A 1H8

Lorne Mitchell
(416) 751-3733

Services: Consulting engineers with experience in active and passive design and feasibility studies.

Projects: Passive residence, Barrie; Post Office, Toronto.

Moriyama & Teshima Architects
32 Davenport Road
Toronto, Ontario
M5R 1H3

Doug Lorriman
(416) 925-4484

Services: Architects with experience in passive design, energy-efficient housing and feasibility studies.

Projects: Meadowvale Demonstration Home; 2 pools; 3 DHW.

OBOE Engineering Ltd.
30 Leacock Drive
Kanata, Ontario
K2K 1S1

Oliver Foulkes
(613) 592-4344

Services: Engineers offering mechanical and electrical design services and feasibility studies. Specialists in industrial and agricultural solar systems.

Projects: Tunney's Pasture, Ottawa; Gunton Fish Hatchery; Belmoral Fish Hatchery; 2 solar grain drying systems; 30 pools; 5 DHW; 7 process hot water; 2 air systems.

Designers, cont.

Okins, Leipciger, Cuplinskas, Kaminker & Assoc. Ltd.
1 Valleybrook Drive
Don Mills, Ontario
M3B 2S7

E.L Cuplinskas
(416) 445-8255

Services: Consulting engineers with experience in active system design, computer simulation, and passive evaluation.

Projects: Oakville-Trafalgar Hospital; Provincial Building, Sudbury; Cambrian College, Sudbury; "Residential Passive Solar Heating", report for Ontario Ministry of Energy.

Piotrowski Consultants Ltd.
1281 Cassells Street
P.O. Box 524
North Bay, Ontario
P1B 8J1

Stefan Krajci
(705) 472-2536

Services: Consulting engineers specializing in heat recovery systems.

Projects: Federal building, North Bay; Simmons residence, Sudbury.

Proctor & Redfern Ltd.
200 S. Syndicate Avenue
Thunder Bay, Ontario
P7E 1C9

Gordon Cuthbertson
(807) 623-3449

Services: Consulting engineers with experience in active solar system design and feasibility studies.

Projects: Confederation College.

Proctor & Redfern Ltd.
75 Eglinton Avenue East
Toronto, Ontario
M4P 1H3

G. Cook

Services: Consulting engineers with experience in active solar system design and feasibility studies.

Projects: Confederation College, Thunder Bay; First Solar Community, Brampton.

RSV Engineering Services
9 Henry Welsh Drive
Willowdale, Ontario
M2R 3P3

Philip Winestone
(416) 665-4584

Services: Professional engineer specializing in all kinds of solar heating system design.

Projects: Dominion Building, Hamilton; Trans-Canada barracks design, DND; Gloucestershire Hall, CFB London.

Reid, Crowther & Partners Ltd.
220 Duncan Mills Road
Don Mills, Ontario
M3B 3J5

Allan Kobayashi
(416) 445-2004

Services: Consulting engineers with experience in liquid, evacuated tube, and heat pipe collectors. Designers of space heating, DHW and air conditioning.

Projects: Sir John Carling Building; Etobicoke Court House.

J.L. Richards & Assoc. Ltd.
864 Lady Ellen Place
Ottawa, Ontario
K1Z 5M2

William F. McGarry
(613) 728-3571

Services: Consulting engineers with experience in DHW system design and feasibility studies.

Projects: Sir Charles Tupper Building; National Library; Tom Brown Arena; Nepean Sportsplex; Quinte Mohawk School.

Roney Systems & Construction
R.R. 1
Gilmour, Ontario
K0L 1W0

Mike Roney
(613) 474-2302

Services: Designer and builder of passive and hybrid houses. Installation of active systems.

Projects: Roney residence; Weeden residence, Coe Hill.

Alister M. Ross
66 Queen Street
Suite 1
Ottawa, Ontario
K1P 5C6

Alister Ross
(613) 238-4903

Services: Architects with experience in energy-efficient and passive solar design.

Projects: Greely Post Office, Ottawa; Lebreton Flats central heating design, Ottawa; private residences.

Sedum, Kanerva & Assoc.
74 Berkeley Street
Toronto, Ontario
M5A 2W7

Septo Kanerva
(416) 364-6665

Services: Architects with experience in DHW systems.

Projects: CNR superintendent's residence, Hornepayne, Ontario.

Shelter Construction & Development Ltd.
R.R. 1
Glencairn, Ontario
L0M 1K0

Jeremy Jenkins
(416) 251-2115

Services: Architects with experience in passive design. Specialists in Arctic housing.

Projects: Rankin Inlet Apartment, NWT; 6 Rankin Inlet residences, NWT; many Ontario and Québec residences.

Smith & Andersen Consulting Engineers Ltd.
601-251 Bank Street
Ottawa, Ontario
K2P 1X2

David Eastwood
(613) 232-2651

Services: Consulting mechanical engineers with experience in active and passive design.

Projects: Greely Post Office; Senior Citizens' Housing, Sarsfield; 2 passive residences.

Solagreen
14-1029 Salisbury Place
Sarnia, Ontario
N7S 4N8

Nik Wistinghausen
(519) 542-9971

Services: Designer with experience in active system and greenhouse design. Author of "Solar Groundhouse". Books and plans.

Projects: 3 solar greenhouses; 1 DHW; 2 active systems.

Solarctic Energy Conscious Housing Inc.
104 - 2nd Avenue
Ottawa, Ontario
K1S 2H5

Sylvia Mitoraj
(613) 234-1593

Services: Architectural technologists specializing in energy-efficient housing and retrofit design.

Projects: CMHC rural and native housing design; residential designs, Armstrong, Ont.

Solar Power Developments Ltd.
3327D Mainway
Box 1025
Burlington, Ontario
L7P 3S9

D. Adkinson
(416) 335-4713

Services: Design consultants specializing in solar systems.

Solun Corporation Ltd.
(see Installers)

Solterra Developments Ltd.
1355 Wellington Street
Ottawa, Ontario
K1Y 3C2

Michael Lambert
(613) 729-3116

Services: Architects and builders specializing in passive solar energy-efficient design and construction, attached greenhouses, and renovations.

Projects: 2 double-stud houses, numerous greenhouses and renovations.

Designers, cont.

J.C. Somfay
442 Union Street
Salem, Ontario
N0B 1S0

J.C. Somfay
(519) 846-0251

Services: Architect with experience in active design.

Projects: 20 DHW; 40 air systems.

Spider Engineering Assoc. (Waterloo) Inc.
P.O. Box 853
Waterloo, Ontario
N2J 4C3

John Ferguson
(519) 884-2920

Services: Research engineers specializing in thermal analysis of residential and commercial buildings, feasibility studies by computer simulation.

Projects: Residential energy conservation study; DHW design study; Mohawk Hospital.

Stoneybrooke Solar Systems Ltd.
239 Lisgar Avenue
Tillsonburg, Ontario
N4G 4N3

Mr. George Balpataky
(519) 842-8080

Services: Architectural technologist and builder of active and passive residences. Installer of active systems.

Projects: 1 active residence; 1 passive residence; pool systems; 1 greenhouse.

Studio Por
R.R. 1
Beachburg, Ontario
K0J 1C0

Peter Alexander Por
(613) 582-3348

Services: Architect with experience in design, and construction of passive buildings and retrofits.

Projects: Laska residence, Cobden; Lewis residence, Beachburg; Henry residence, Rockland; MacKenzie residence, Pembroke.

Sun-Sense Ltd.
(see Installers)

Sunbuilders Inc.
215 Piccadilly Street
Suite 305
London, Ontario
N6A 1S2

Wilfrid B. Lamb
(519) 672-8610

Services: Architects specializing in energy-efficient low cost housing.

Sun Parlor Solar
Box 74A, R.R. 4
Amherstburg, Ontario
N9V 2Y9

R. Edgar Scrutton
(519) 736-5815

Services: Designer and consultant on active and passive systems for new and retrofit construction. Energy audits. Workshops and solar courses at St. Clair Community College.

Projects: 1 process hot water system; 1 greenhouse.

Swan, Wooster Engineering Co. Ltd.
107 Yates Street
St. Catharines, Ontario
L2R 6S4

Joseph Ha
(416) 685-8442

Services: Consulting engineers with experience in process hot water system design.

Projects: Secordwood Primary School.

Townend, Stefura, Baleshta & Nicholls, Architects
255 Larch Street
Sudbury, Ontario
P3B 1M2

O.J. Baleshta
(705) 675-3383

Services: Architects with experience in DHW and air space heating design.

Projects: 2 DHW; 3 air systems.

TSOW/Pollard Partnership
421 Eglinton Avenue E.
Suite 103
Toronto, Ontario
M4P 1M6

D. Pollard
(416) 487-4787

Services: Architects with experience in active and passive design.

Projects: Cobourg School; Keswick residence.

Tymura Solar Designs
R.R. 15, Hilldale Road
Thunder Bay, Ontario
P7B 5N1

E.J. Tymura
(807) 767-8254

Services: Experience in active and passive design and monitoring.

Projects: Quetico residence and office building; Long Dog Lake lumber kiln; Wilson solarium and pool; residences.

Watershed Energy Systems Ltd.
(see Manufacturers)

Yang's Consultants Ltd.
244 Fairbank Crescent
Thunder Bay, Ontario
P7B 5L9

K.C. Yang
(807) 767-3283

Services: Designers of solar kilns for lumber and crop drying.

Projects: 2 kilns, Lakehead University; commercial kiln, Long Dog Lake.

Distributors and Dealers

Advanced Idea Mechanics Ltd.
(see Designers)

Airflow Developments (Canada) Ltd.
1281 Matheson Boulevard
Mississauga, Ontario
L4W 1R1

Brian Cornwall
(416) 624-2133

Services: Distributors of monitoring instruments.

Projects: Suppliers for NRC, CSA and private research contractors.

Altech Industries
(see Manufacturers)

Alternatives
35 Langevin Ave, Apt. 2
Ottawa, Ontario
K1M 1G1

Huguette Poulin
(613) 745-0121 (December to March)
(819) 827-2501 (April to November)

Services: Distributor of Window Quilt insulating blinds.

Amherst Renewable Energies Ltd.
(see Manufacturers)

A. Bruce Benson Ltd.
(see Installers)

Burlington Solar Heating Products
2289 Fairview Street
Burlington, Ontario
L7L 3Y6

C. Alfred Rydholm
(416) 637-2668

Services: Distributors of Solarsystems, Sun Ray and Solarplast collectors. Installers of DHW systems.

Projects: 4 DHW.

Distributors & Dealers, cont.

Canadian G.E.M. Industries Ltd.
P.O. Box 403
Oakville, Ontario
L6J 5A8

Michael Killip
(416) 827-6446

Services: Distributors of Window Quilt thermal blinds.

Chemplast
2450 Durwin Drive, Units 5, 6 & 7
Mississauga, Ontario
L5L 1J9

Eugene Gatza
(416) 828-2100

Services: Distributors of TEFLON FEP and Clear Llumar glazing films.

Conserval Engineering Inc.
(see Designers)

Dahl Brothers Canada Ltd.
2600 South Sheridan Way
Mississauga, Ontario
L5J 3Y1

T. Husebye
(416) 822-2330
(800) 268-5355

Services: Distributors of Clorius thermal energy meter.

Efstonscience Inc.
3500 Bathurst Street
Toronto, Ontario
M6A 2C6

E. Efston
(416) 787-4583

Services: Distributor of Solarex photovoltaic cells and panels.

Energy North International Ltd.
(see Designers)

The Energy Store
(see Installers)

Envirotron Solar
(see Installers)

First Co-operative Solar Co. Ltd.
(see Designers)

E.S. Gallagher Sales
44 Eugene Street
Toronto, Ontario
M6B 3Z4

David Gallagher
(416) 789-5385

Services: Distributor of Rho Sigma controls and Maid-O-Mist air venting equipment for DHW systems.

Kee Klamp Division
Gascoigne Industrial Products Ltd.
159 Rayette Road
Concord, Ontario
L4K 1C7

Sales Department
(416) 669-1494

Services: Distributors of Kee Klamp collector support systems.

Kerr Solar Systems
(see Installers)

Lenpar Corp.
415 Hood Road, Unit 21
Markham, Ontario
L3R 3W2

David Jagger
(416) 475-0697

Services: Distributors of Grundfos pumps, circulators and boosters.

Ontor Ltd.
12 Leswyn Road
Toronto, Ontario
M6A 1K3

Phil Weiss
(416) 781-5286

Services: Stocking distributor for Little Giant Solar Circulating Pumps.

Philips Electronics Ltd.
601 Milner Avenue
Scarborough, Ontario
M1B 1M8

B.N. Clarkson
(416) 292-5161 Ext. 2522

Services: Distributors of Philips evacuated tubes and components.

Prometheus Energy
7773 Yonge Street
Thornhill, Ontario
L3T 2C4

R. McMonagle
(416) 881-3369

Services: Distributors of renewable energy products including absorber plates, glazing, controls, and automatic vents. Design, consulting and contracting service.

Projects: Elbert residence, Richmond Hill; Skodyn attached greenhouse, Thornhill; 6 pool systems.

Renndale Solar Associates Ltd.
(see Installers)

Solar Canada
4776 Wyandotte St. E.
Windsor, Ontario
N8Y 1H7

Roland Demers
(519) 945-6322

Services: Distributors of solar equipment including Solar Usage Now products. Retailers of solar books and manuals. Do-it-yourself solar workshops. Installation of pool and air systems.

Solarmart
2084 Vickery Drive
Oakville, Ontario
L6L 2J3

(416) 827-2579

Services: Distributors of a wide variety of parts, components and kits for the on-site construction of solar systems.

SolarQuip Sales
136 Plaintree Drive
Sault Ste. Marie, Ontario
P6B 5H3

Stanley R. Mole
(705) 949-4569

Services: Distributors of Heliotrope General controls, Lossnay air-to-air heat exchangers, Petro-Sun DHW and pool systems, Watershed space heating systems and honeycomb glazing.

Solar Source Developments Inc.
(see Installers)

Solar Supply & Insulation
119 John Street
Ingersoll, Ontario
N5C 3E9

W.M. Vannatter
(519) 485-2981

Services: Supply and distribution of high temperature collector insulation and in-ground heat pump components. Installation of active systems.

Projects: 3 pools; 2 process hot water; 1 air system.

Solartech Ltd.
(see Manufacturers)

Suntrap Systems
P.O. Box 384
Guelph, Ontario
N1H 6K5

Leo A. Rodrigues
(519) 822-2762

Services: Distributors of ISIS solar heaters, Delta-T and Heliomatic controls, Olin and Terra Light absorbers, Grundfos pumps, Turbonics heat exchangers, Tectonic insulation panels, Solar Black absorber paint and greenhouse kits.

The Sunwrights
(see Public Information)

Trivco Promotions Inc.
2050 Ellesmere Road
Units 10 & 11
Scarborough, Ontario
MIH 3A9

Ron McHugh
(416) 438-4461

Services: Distributors and installers of "Solar Economizer" window collector systems.

Weldon Building Centre
590 Strathcona Ave, R.R. 13
Lakeshore Drive
Thunder Bay, Ontario
P7B 5E4

John Kozak
(807) 683-6281

Services: Distributors of Lindal Cedar Homes.

Installers

Allied Mechanical Maintenance Ltd.
340 McLeod Street, Suite 307B
Ottawa, Ontario
K2P 1A4

J. Rasmussen
(613) 234-7117

Services: Plumbing and heating contractors with experience in DHW installation.

Projects: Algonquin College; Vanier Post Office; DPW Stores, Vanier; St. John's House, Ottawa.

Astro Plumbing & Heating Ltd.
1096 Ogden Avenue
Mississauga, Ontario
L5E 2G6

Don Burke
(416) 274-8033

Services: Plumbing and heating contractors. Union.

Projects: DHW, process hot water, air system.

Black & MacDonald Ltd.
557 Cambridge Street S.
Ottawa, Ontario
K1S 4J4

M.T. Sharp
(613) 238-1226

Services: Mechanical contractors with experience in DHW installations.

Projects: 4 DHW, Experimental Farm, Ottawa; 2 DHW CFB North Bay; DHW, Sir John Carling Building, Ottawa.

A. Bruce Benson Ltd.
1810 Bank Street
Ottawa, Ontario
K1V 7Y6

A. Bruce Benson
(613) 733-0332

Services: Contractor with experience in pool and DHW system installation; distributor of solar components.

Projects: 40 pools.

F.G. Bowie & Sons Ltd.
1500 Star Top Road
Ottawa, Ontario
K1B 3W6

D.F. Tipper
(613) 746-5300

Services: Specialists in selection, installation and wiring of solar system controls. Union.

Projects: Process hot water, air space heating systems.

Brady & Seidner Ltd.
801 Alness Street
Downsview, Ontario
M3J 2H8

Joe K. Seidner
(416) 661-1981

Services: Mechanical contractors with experience in pool and DHW installation. Union.

Projects: 4 pools, 18 DHW; Aylmer Senior Citizens' Residence; Ontario Hydro Building; Sunoco Building, Toronto.

C.J. Brubacher Ltd.
19 First Street E.
Elmira, Ontario
N3B 2E6

R.M. Brubacher
(519) 669-3362

Services: Mechanical contractors with experience in installation of air space heating systems.

Projects: 4 residential air systems.

Bryant Heating & Cooling Co. Ltd.
3839 Walker Road
Windsor, Ontario
N8W 3T1

J. St. Louis
(519) 966-1550

Services: Heating contractors.

Projects: Pool, air space system.

Burlington Solar Heating Products
(see Distributors and Dealers)

Burton Plumbing & Heating Ltd.
925 Alloy Drive
Thunder Bay, Ontario
P7B 5Z8

A.L. Villeneuve
(807) 623-8652

Services: Plumbing and heating contractors. Union.

Projects: 1 DHW; 1 process hot water; Tymura residence.

Candaplan Group Inc.
393 Rymal Road W.
Hamilton, Ontario
L9B 1V2

A. Omar Elwedini
(416) 389-3893

Services: Designers, planners and project managers with experience in DHW system design and installation.

Projects: St. Elizabeth Nursing Home; St. Margit Custodial Home; St. Elizabeth Village Development; 93 DHW systems.

Gerald Davidson Plumbing & Heating Ltd.
1 Loyalist Drive
Brighton, Ontario
K0K 1H0

Barry Box
(613) 475-1732

Services: Mechanical contractors with experience in DHW installation.

Projects: Joyceville Penitentiary.

Donnelly-Ostapec Ltd.
33 Glen Cameron Road, Unit 4
Thornhill, Ontario
L3T 1N9

Paul Ostapec
(416) 889-9720

Services: Plumbing contractors. Union.

Projects: 1 pool, Rexdale.

Durcard Mechanical Contractors Ltd.
23 Westmore Drive, Unit 7
Rexdale, Ontario
M9V 3Y7

J. Edwards
(416) 746-1222

Services: Electrical and mechanical contractors with experience in solar installation. Union.

Projects: 2 DHW; 1 process hot water; 1 air space heating system; Ontario Government laboratory.

The Energy Store
Skarlan Enterprises Ltd.
1392 Clyde Avenue
Nepean, Ontario
K2G 3J2

Darryl Pochailo
(613) 822-0821

Services: Solar installers with experience in pool and DHW systems. Distributors of solar equipment.

Projects: 26 pools; 11 DHW; 1 solar greenhouse; Fourth Avenue Post Office, Ottawa; Campeau Model Home, Kanata.

Envirotron Solar
2600 Drew Road
Mississauga, Ontario
L4T 3M5

Dennis Banning
(416) 677-1020

Services: Distribution, installation and servicing of pool and DHW systems.

Projects: Scarborough Municipal Pool; hundreds of residential pools and DHW systems.

Ford Mechanical
P.O. Box 1079
Peterborough, Ontario

W.E. Turner
(705) 743-7545

Services: Mechanical contractor with experience in installation of industrial/commercial mechanical systems. Union.

Projects: 1 DHW; 1 process hot water; 1 air space heating system; Ontario government building, Oshawa.

Installers, cont.

H.G. Francis & Sons Ltd.
506 Gladstone Avenue
Ottawa, Ontario
K1R 5P1

Reg G. Francis
(613) 238-4700

Services: Plumbing and heating contractors with experience in solar installation. Union.

Projects: 1 air space heating system; Rideau Falls Demonstration Project, NRC.

General Solar Inc.
(see Designers)

Granzotto Mechanical Inc.
304 Garyray Drive
Weston, Ontario
M9L 1P4

Mario Granzotto
(416) 745-3041

Services: Plumbing and heating contractors with experience in DHW installation.

Projects: 1 DHW; Newmarket Courthouse.

Archie Horn & Son Ltd.
26 Roxborough Avenue
Hamilton, Ontario
L8L 1Y1

Paul Horn
(416) 545-1133

Services: Plumbing contractors with experience in installation and maintenance of DHW systems.

Projects: 1 DHW.

Austin Janes & Co. Ltd.
1568 Pharmacy Avenue
Scarborough, Ontario
M1R 2K7

Steven S. Janes
(416) 447-3511

Services: Heating and plumbing contractor with experience in DHW installation. Union.

Projects: 4 DHW; Ontario Science Centre, evacuated tube system; Ontario Hydro building; private residences.

Keli Mechanical Ltd.
1407 Plank Road
Sarnia, Ontario
N7T 7H3

Jack Sheldon
(519) 336-5220

Services: Mechanical contractors. Union.

Projects: 1 air space system; I.O.L. Research and Development Centre.

Kerr Solar Systems
R.R. 1
Highway 2 East
Chatham, Ontario
N7M 5J1

Wilson H. Kerr
(519) 354-4127

Services: Electrician with experience in pool and DHW installations, active and passive designs. Distributors of Bio-Energy pool systems, SolaRoll and Delta-T controllers.

Projects: 4 pools; 1 DHW; 1 air space system, Pelee Park Warden's Building; McKeon passive residence.

Marcotte Mechanical Ltd.
P.O. Box 4517, Station D
Hamilton, Ontario
L8V 4S7

R.N. Marcotte
(416) 387-4020

Services: Mechanical contractors. Union.

Projects: 1 pool; 1 DHW.

Mechanical Contracting Trades Ltd.
Box 1187, Station B
Burlington, Ontario
L7P 3S9

R. North
(416) 335-1526

Services: Mechanical contractors with experience in commercial installation.

Projects: Air space heating systems; Mississauga school; Oakville commercial building.

Modern Mechanical
48 Colonnade Road
Nepean, Ontario
K2E 7J6

John R. McAninch
(613) 225-3670

Services: Mechanical contractors with experience in a wide range of large scale solar installations. Union.

Projects: 4 pools; 9 DHW; 3 process hot water; 3 air space systems; Barracks, Ottawa; National Police Services Building; Cambrian College, Sudbury.

Nelco Mechanical Ltd.
77 Edwin Street
Kitchener, Ontario
N2H 4N7

Del Ulmer
(519) 744-6511

Services: Mechanical contractors with experience in solar system installation. Union.

Projects: 3 pools; 2 DHW; 2 air space heating systems; car wash.

J.A. Norton Co. Ltd.
199 Ashtonbee Road
Scarborough, Ontario
M1L 2P1

Robert Serteantson
(416) 752-1000

Services: Mechanical contractors with experience in commercial system installation. Union.

Projects: 3 DHW; 1 air space system; West Humber School; Wallace Emmerson Community Centre.

Olympic Plumbing & Heating
Box 1253
Fonthill, Ontario
L0S 1E0

Ray Gunn
(416) 892-8391

Services: Plumbing and heating contractors. Union.

Projects: 1 pool; 2 DHW.

William Petrie & Sons Ltd.
1071 Lorne Park Road
Mississauga, Ontario
L4H 2Z9

Bill Petrie
(416) 278-5207

Services: Installation of pool systems.

Projects: 2 pools.

Prometheus Energy
(see Distributors and Dealers)

Pro-Tel
5725 Dalton Avenue
Windsor, Ontario
N9H 1M9

Len Mulvaney
(519) 969-2359

Services: Contractors with experience in pool and DHW installation.

Projects: 3 pools; 2 DHW.

Renndale Solar Associates Ltd.
5129 Tomken Road
Mississauga, Ontario
L4W 1P1

Bill Rennie
(416) 625-5371

Services: Solar installers with experience in pool and DHW installation. Instructor for CSIA installation workshops. Distributor of Solar-7 pipe insulation.

Projects: 5 pools, Ontario Hydro; 6 DHW, Provincial Parks; Seaway Pools spa system.

Ram Mechanical Contractors
P.O. Box 159
Belleville, Ontario
K8N 2R9

Clarence Inglis
(613) 962-9574

Services: Mechanical contractors with experience in DHW installation.

Projects: Space heating and DHW, Quinte Mohawk.

Sawtell Solar Ltd.
5 Ashbury Place
Ottawa, Ontario
K1M 1H3

J.M. Thorn
(613) 746-3839

Services: Solar installer with experience in pool installation.

Projects: 2 pools.

Solequair Corp.
(see Manufacturers)

SolarQuip Sales
(see Distributors and Dealers)

Installers, cont.

Solar Canada
(see Distributors and Dealers)

Solar Source Developments Inc.
600 Old Goulais Bay Road
Sault Ste. Marie, Ontario
P6A 5K8

Frank Balogh
(705) 254-6052

Services: Installers of pool and DHW systems. Distributors of Solatherm, Fafco and Solartech systems and Window Quilt thermal blinds.

Projects: 3 pools; 1 DHW.

Solar Supply & Insulation
(see Distributors and Dealers)

Solar Swim
R.R. 5
Orangeville, Ontario
L9W 2Z2

M. Gardner
(519) 941-6049

Services: Solar installers specializing in pool systems.

Projects: 300 pools, 5 DHW.

Solar Temp Systems Ltd.
(see Manufacturers)

Solun Corporation Ltd.
P.O. Box 1666
Guelph, Ontario
N1H 6R7

D.R. Grainger
(519) 836-5652

Services: General contractors specializing in energy-efficient construction. Distributors and installers of air space heating and DHW systems.

Projects: Downsview Postal Station; Bolton residence, Ayre; Moss residence, Tottenham; Rice residence, Elora.

Stoneybrooke Solar Systems Ltd.
(see Designers)

Stranghetta Ltd.
262 John Street
Sault Ste. Marie, Ontario
P6A 1P5

Michael Stranghetta

Services: Plumbers with experience in DHW installation.

Projects: 1 DHW; Wright residence.

Sunglo Solar Ltd.
(see Manufacturers)

Sun-Ray Solar Systems Ltd.
(see Manufacturers)

Sun-Sense Ltd.
965 Maitland Street
London, Ontario
N5Y 2X3

Michael Bartezak
(519) 438-5428

Services: Installers and distributors of DHW, pool and space heating systems. System design.

Projects: 30 pools, 12 DHW.

Suntricity
P.O. Box 1293
Cambridge, Ontario
N1R 7G6

David Murphy
(519) 623-5256

Services: Installers of pool systems.

Projects: 1 pool.

Torontario International Mechanical & Electrical Co. Ltd.
319 Carlaw Avenue
Toronto, Ontario
M4M 2S1

Steven Mirkopoulos
(416) 469-5971

Services: Mechanical and electrical contractors with experience in DHW installation.

Projects: North York PWC Headquarters Building; Scarborough apartment DHW.

Woodcroft Mechanical Contractors Ltd.
1777 Oxford Street E.
London, Ontario
N5V 2Z6

Bart Woodcroft
(519) 453-8470

Services: Mechanical contractors. Union.

Projects: 1 DHW; 1 air space system; Benmillar Inn; Glenhill House.

Gordon Wright Ltd.
4564 Montrose Road
Niagara Falls, Ontario
L2H 1K2

G.E. Young
(416) 356-5730

Services: Mechanical contractor. Union.

Projects: 2 pools.

Manufacturers

ADMIC Controls
Box 7068, Station A
Toronto, Ontario
M5W 1X7

C. Rhodes
(416) 881-4112

Services: Design, manufacture, installation and maintenance of computer control and monitoring systems.

Projects: 3 major apartment buildings in Toronto.

Altech Industries
238 King Street North
Powassan, Ontario
P0H 1Z0

Brian Lumley
(705) 724-2911

Services: Design, manufacture, and installation of insulated window curtains.

Amherst Renewable Energies Ltd.
1070 Morrison Drive
Ottawa, Ontario
K2H 8K7

(613) 820-3274

Services: Manufacturers of Amherst liquid flat plate collectors, fiber matrix air collectors, and closed loop DHW systems. Data acquisition and processing Amherst/Watsun simulation. Distributors of Noranda liquid-to-liquid heat exchangers. System design and installation.

Projects: Gunton Fish Hatchery, Manitoba; Confederation College, Thunder Bay; Personnel Records Building, Ottawa; DHW Systems I.M.R., P.E.I.; Bata Shoe Factory, Picton: Ontario Science Centre.

S.A. Armstrong Ltd.
1400 O'Connor Drive
Toronto, Ontario
M4B 2T9

K. Pearson
(416) 755-2291

Services: Design, manufacture, sales and service of Armstrong pumps and heat exchangers.

Projects: Globe and Mail Building; Suncor Building; Imperial Oil Building; Postal Stations, Toronto.

Bonsall Import and Export Inc.
60 Nably Court
Scarborough, Ontario

(416) 298-6928

Services: Manufacturers of Air-Cells Solar Pool Cover.

Chemacryl Plastics Ltd.
73 Richmond Street W., Suite 500
Toronto, Ontario
M5H 2A2

Mike Ehmann
(416) 869-0013

Services: Manufacturers of glazings for greenhouses and passive systems.

Projects: Ark, P.E.I.; Enercon building; Specht residence.

Manufacturers, cont.

Clemmer Industries Ltd.
446 Albert Street
Waterloo, Ontario
N2J 4A1

A.G. Meyers
(519) 884-4320

Services: Manufacturers of custom-designed water storage tanks.

Projects: Government Services Building, Sudbury; Blenheim Nursing Home.

Conserval Products
71 Industrial Avenue
Carleton Place, Ontario
K7C 3V7

(613) 257-7620

Services: Manufacturers of Conserval solar controllers.

Dauncey Sayles Thermal Engineering
1080 Brock Road, Units 11 & 12
Pickering, Ontario
L1W 3H3

Larry Dauncey
(416) 831-1232

Services: Manufacturers of Blue Shield Thermal Pool Blankets.

DuPont Canada Inc.
Packaging Division
P.O. Box 2200, Streetsville
Mississauga, Ontario
L5M 2H3

B.T. Sterling
(416) 821-3300

Services: Manufacturer of collector glazings: Tedlar, Teflon and Lucite.

EnerSource Inc.
P.O. Box 1688
St. Catharines, Ontario
L2R 7K1

Richard Copeland
(416) 688-6267

Services: Manufacturers of liquid flat plate collectors and DHW systems.

Projects: Orchard Grove Motel, Niagara Falls; Schlombs residence, Vineland; Moggeridge residence, Niagara-on-the-Lake.

English Plastics Inc.
2 Finley Road
Brampton, Ontario
L6T 1A9

J.P. Mathisen
(416) 451-6860

Services: Plastics supplier with vacuum-forming facilities for custom collector casings and reflectors, blown acrylic for collector covers and vacuum metalizing for reflective surfaces.

H.S.T. Synthetics Ltd.
2550 Goldenridge Road, Unit 38
Mississauga, Ontario
L4X 2S3

Mr. T. Tiler
(416) 275-3392

Services: Manufacturers of Nite Cap Foam Blanket.

Johnson Controls Ltd.
929 Warden Avenue
Scarborough, Ontario
M1L 4C6

Sales Desk
(416) 755-1137

Services: Manufacturer of differential temperature controls.

Lennox Industries (Canada) Ltd.
400 Norris Glen Road
Etobicoke, Ontario
M9C 1H5

Rody Parker
(416) 621-9302

Services: Manufacturers of liquid collectors and DHW systems.

Markko Construction
195 Kennedy Road S., Suite 309
Brampton, Ontario
L6W 3H2

R. Cairenius
(416) 453-4325

Services: Manufacturer of Markko Solar Controllers.

Projects: Research and development contract work for NRC.

Nortec Solar Industries Inc.
P.O. Box 760
Manotick, Ontario
K0A 2N0

Jim Ramsden
(613) 692-2513

Services: Manufacturers of thermal diode liquid collectors and closed loop DHW systems.

Projects: South Block, Parliament Hill; Cambrian College, Sudbury; Ottawa Athletic Club.

Polytarp Products
11 Lepage Court
Downsview, Ontario
M3J 2A3

(416) 633-2231

Services: Manufacturers of V.I.P. Solar Pool Blanket.

Reynolds Extrusion Co. Ltd.
500 Edward Avenue
Richmond Hill, Ontario
L4C 4Y9

G. Groves or M. Beresford
(416) 884-9161

Services: Manufacturers of aluminum extrusions used in collector production.

Sealed Air of Canada Ltd.
95 Glidden Road
Brampton, Ontario
L6T 2H8

Linda Verner
(800) 268-0807 Toll Free

Services: Manufacturers of Sealed Air Solar Pool Blanket.

A.O. Smith Corp.
P.O. Box 310
Stratford, Ontario
N5A 6T3

George Pick
(519) 271-5800

Services: Manufacturers of water storage tanks for DHW systems.

Solaquair Corp.
111 Merton Street, Suite 201
Toronto, Ontario
M4S 1A8

Frank Sloan
(416) 486-7108

Services: Manufacturers and installers of DHW systems.

Solarcells Ltd.
3327D Mainway, Box 1025
Burlington, Ontario
L7P 3S9

Don Adkinson
(416) 335-4713

Services: Manufacturer of silicon photovoltaic cells and photovoltaic modules. Consulting and photovoltaic system design.

Solarfin Products
14 Victoria Avenue N.
Hamilton, Ontario
L8L 5E1

Richard Higgins
(416) 522-4132

Services: Manufacturer of Mobile Solar Test Facility, a teaching tool designed to test student-built collectors. Device includes pumps, heat exchangers, controls, recording pyranometer, flow meter and electronic thermometer.

Manufacturers, cont.

Solarpanels Ltd.
3327D Mainway, Box 1025
Burlington, Ontario
L7P 3S9

Don Adkinson
(416) 335-4713

Services: Manufacturer of Sunsaver DHW package. Installation of pool systems.

Projects: 30 pools; 4 DHW; 3 air space heating systems.

Solarplast Ltd.
1045 Hargrieve Road
London, Ontario
N6E 1P6

David Ritchie
(519) 685-1480

Services: Manufacturers of Solarplast glazed and unglazed pool collectors.

Projects: Delorraine municipal pool, Manitoba; Clear Lake Fish Hatchery, Winnipeg; Point-aux-Cascades Municipal pool, Québec.

Solartech Ltd.
39 Cranfield Road
Toronto, Ontario
M4B 3H6

David Mandelstam
(416) 752-4990

Services: Manufacturers of QMAX drainable evacuated tube collectors, liquid flat plate collectors, Solair air flat plate collectors, DHW systems and a site-assembled air system. Designers of solar systems. Distributors for: Hawthorne Industries, Solar Control Corp., Grundfos, Ford Industries, Sun Ray Solar Industries, Ergenics black chrome products.

Projects: South Central Letter Processing Plant, Toronto; Barrhaven Sports Facility, Ottawa; Mountain Spring Beverages, Edmonton; Dominion Envelope, Toronto; Sunoco Building, Toronto.

Solar Temp Systems Ltd.
1110 Brydges Street
London, Ontario
N5W 2B6

Brian Maguire
(519) 451-2962

Services: Manufacturers of Solar Temp liquid flat plate collectors. Solar systems design, DHW installation.

Projects: Imperial Oil Bulk Plant, Toronto; Western Fair Raceway, London; Benmiller Inn, Goderich; Clinton residence; 3 pools; 3 DHW; 2 process hot water; 3 air systems.

Solar World Heating Systems Corp.
3814 Victoria Park Avenue
Willowdale, Ontario
M2H 3H7

G.E. McKinnon
(416) 494-5829

Services: Manufacturer of pool, liquid, air and photovoltaic collectors and DHW systems.

Solatherm Inc.
2600 Drew Road
Mississauga, Ontario
L4T 3M5

Dennis Banning
(416) 677-1020

Services: Manufacturer of liquid collectors, closed loop and drain back DHW systems.

Projects: Applewood School; Vista del Sol; Globe and Mail, Toronto; City Delivery Building, Toronto.

Solcan Ltd.
R.R. 3
London, Ontario
N6A 4B7

Bob Swartman
(519) 473-0501

Services: Manufacturer of liquid flat plate collectors and DHW systems. Design and installation of solar systems and solar greenhouses.

Projects: Twin Pines, London; Senior Citizen Home, Halifax; Polysar, Sarnia; 10 greenhouse installations.

Solestial Solar Panels Ltd.
44 Bartlett Road, Box 359
Beamsville, Ontario
L0R 1B0

Gary Colling
(416) 563-8203

Services: Manufacturer of liquid flat plate collectors.

Projects: 10 pools; 2 DHW; St. Catharines residence; Sifton residence, London.

Sonotek Ltd.
2410-5 Dunwin Drive
Mississauga, Ontario
L5L 1J9

James M. Macrae
(416) 828-6810

Services: Manufacturers of sun photometers and microprocessor based on data loggers and data acquisitions systems.

Projects: 'MATER' system, NRC; sun photometers, AES.

Sunglo Solar Ltd.
1081 Alness Street
Downsview, Ontario
M3J 2J1

Joe Sherman
(416) 661-2560

Services: Manufacturers of pool systems, unglazed pool collectors and a packaged control unit. Installation service.

Projects: 1,500 pools.

Sun Ray Solar Systems Ltd.
2429 Seminole Street
Windsor, Ontario
N8Y 1X2

Earl Pattison
(519) 253-1182

Services: Manufacturer of liquid flat plate collectors and closed loop DHW systems. Installation of DHW, process hot water and space heating systems.

Projects: Public Works Canada, Richmond Hill; Sarnia Post Office; Ontario Hydro, Toronto.

Taco (Canada) Ltd.
3090 Lenworth Drive
Mississauga, Ontario
L4X 2G1

R.A. Sinclair
(416) 625-2160

Services: Manufacturer of Taco pumps.

Tempglass Ltd.
131 Ormont Drive
Weston, Ontario
M9L 2S3

I. Moore
(416) 749-7932

Services: Manufacturers of low iron safety glass.

Temperature Specialties Manufacturers Ltd. (Tempec)
585 Canarctic Drive
Downsview, Ontario
M3J 2P9

Tibor Lucas
(416) 661-0535

Services: Manufacturer of glazed liquid, air flat plate collectors and closed loop DHW system.

Projects: Provident House, King City; Oakville Trafalgar Hospital; Ontario Correctional Institute, Brampton Provincial Office Building, Sudbury.

Thermon Canada Ltd.
431 Newbold Street
London, Ontario
N6E 1K2

Murray Smith
(519) 681-1740

Services: Manufacturers of heat transfer cement.

Thermo Shutter
1662 Bonhill Road, Unit 15
Mississauga, Ontario
L5T 1E1

(416) 671-2242

Services: Manufacturers of insulating window shutters.

TPK Solar Systems Inc.
149 Bentley Avenue, Bay 4-A
Nepean, Ontario
K2E 6T7

R.E. Thomas
(613) 225-4403

Services: Manufacturers of photovoltaic cells and panels.

Projects: Ontario Hydro, Atikokan.

Manufacturers, cont.

Tremco Canada Ltd.
220 Wicksteed Avenue
Toronto, Ontario
M4H 1G7

Lynn Walker
(416) 421-3300

Services: Manufacturers of extruded rubber products and silicone sealants. Custom extrusion facilities.

Walmar
15 Caesar Avenue
Nepean, Ontario
K2G 0B1

Ken Frank
(613) 225-4615

Services: Manufacturer of support systems for collector arrays.

Watershed Energy Systems Ltd.
97 Six Point Road
Etobicoke, Ontario
M8Z 2X3

Bruce Morton
(416) 233-3241

Services: Manufacturer of honeycomb air collectors, glazed liquid collectors, and convection suppressant glazing. Design, engineering and installation of air systems.

Projects: Downsview Postal Station, Toronto; St. Barnabas Church, London; Pincer Creek Senior Citizens Home, Alberta; residential systems.

John Wood Ltd.
101 Hanson Street
Toronto, Ontario
M4C 1A2

George McNeill
(416) 698-9100

Services: Manufacturers of glass-lined DHW storage tanks.

Zedax Products Inc.
1875 Leslie Street, Unit 6
Don Mills, Ontario
M3B 2M5

Ron Sidon
(416) 441-2353

Services: Manufacturers of pumps.

Public Information

Canadian Copper and Brass Development Assn.
55 York Street, Suite 1612
Toronto, Ontario
M5J 1R7

A. Arnold Knapp
(416) 363-8826

Services: Non-profit organization sponsored by the Canadian copper industry to develop and promote use of copper.

Projects: Free technical literature on solar heating and cooling.

CREN Publishing Ltd.
P.O. Box 4869
58 Arthur Street
Ottawa, Ontario
K1S 5J1

Doug Nixon
(613) 238-5591

Services: Publishers of "Renewable Energy News", an international monthly newspaper devoted to renewable energy issues and developments.

Canadian Solar Industries Assn.
67A Sparks Street
Ottawa, Ontario
K1P 5A5

Adrian Gatrill
(613) 237-7000

Services: National association of firms, organizations, and individuals engaged in the solar industry. Lobbies government regarding legislation and regulations affecting solar industry.

Projects: Surveys of solar designers and installers, solar DHW installation courses, solar design seminars, "Solar Report" newsletter, "Solar Product Data File", other solar-related publications.

Energy Lifestyle Show
1 Sparks Avenue, Suite T4
Willowdale, Ontario
M2H 2W1

Ian Russell
(416) 496-0551

Services: Organizers of largest trade and consumer energy exhibition in Canada.

John Hix Architects
(see Designers)

Kemptville College of Agricultural Technology
Continuing Education
Kemptville, Ontario
K0G 1J0

Phyllis Brown
(613) 258-3411

Services: Workshops in solar greenhouse design and operation.

National Research Council Solar Energy Project
Montreal Road
Ottawa, Ontario
K1A 0R6

Services: Publications and reports on a variety of solar research projects.

Renewable Energy in Canada
107 Amelia Street
Toronto, Ontario
M4X 1E5

Robert Argue
(416) 463-5424

Services: Publishers of books on conservation and renewable energy. Documentation of energy-efficient housing.

Projects: Books: "The Sun Builders"; "The Solar Water Heater Book"; "The Well-tempered House"; "Solar Greenhouses for Cold Climates" (in progress); "Super Insulated Retrofit Book".

Ryerson Energy Centre
Ryerson Polytechnical Institute
50 Gould Street
Toronto, Ontario
M5B 1E8

H. (Ken) Burkhardt
(416) 595-5071

Services: Courses on solar heating and collector design. Publishers of "Canadian Energy Directory".

Projects: Professional development workshops and conferences.

Solagreen
(see Designers)

SESCI Eastern Ontario
R.R. 3
Dalkeith, Ontario
K0B 1E0

SESCI Hamilton
℅ S. Mendiratta
Mohawk College
P.O. Box 2034
Hamilton, Ontario
L8N 3T2

SESCI Kawartha
611 Weller Street
Peterborough, Ontario
K9J 4W8

SESCI Kent
℅ Wilson Kerr
R.R. 1
Chatham, Ontario
N7M 5J1

SESCI Mississauga-Oakville
℅ Sheridan Park Assn.
2275 Speakman Drive
Mississauga, Ontario
L5K 1B1

SESCI Ottawa
Box 1092
Station B
Ottawa, Ontario
K1P 5R1

SESCI Sarnia
℅ Carl Blackmore
R.R. 2
Camlachie, Ontario
N0N 1E0

SESCI Simcoe County
℅ Georgian College
Technical Building
401 Duckworth Street
Barrie, Ontario
L4M 3X9

SESCI South West Ontario
P.O. Box 2872, Station A
London, Ontario
N6A 4H9

SESCI Toronto
P.O. Box 396, Station D
Toronto, Ontario
M6P 3J9

SESCI Waterloo
℅ Stephen Carpenter
P.O. Box 891
Waterloo, Ontario
N2J 4C3

SESCI Windsor-Essex
℅ Edgar Scanlon
P.O. Box 74A
R.R. 4
Amherstburg, Ontario
N9V 2Y9

Solarfin Products
(see Manufacturers)

Public Information, cont.

Sun Parlor Solar
(see Designers)

The Sunwrights
483 McLaren Street
Ottawa, Ontario
K1R 5K5

Jonathan Cloud
(613) 234-2427

Services: Research on solar greenhouses, hybrid passive systems and solar retrofitting. Distributors of Sunplace solar greenhouses.

Projects: Roof-top greenhouses; attached solar greenhouses.

Twin Valleys School
R.R. 1
Wardsville, Ontario
N0L 2N0

Richard Simpson
(519) 785-0400

Services: Residential educational community offering courses on renewable energy.

Projects: Prepared appropriate Energy Curriculum for Ontario Ministry for Colleges and Universities; solar dome greenhouse; liquid and air solar systems.

Research and Development

Bonaventure Design & Programming Ltd.
130 Slater Street, 10th Floor
Ottawa, Ontario
K1P 6E2

Michael Bein
(613) 238-6560

Services: Data reduction analysis of monitored solar projects.

Projects: NRC solar demonstration buildings.

Buchan, Lawton, Parent Ltd.
325 Dalhousie Street
Suite 700
Ottawa, Ontario
K1N 7G2

Don Buchan
(613) 233-7724

Services: Consulting engineers specializing in solar monitoring and analysis.

Projects: Monitoring and commissioning projects for DPW, NRC, EMR.

CEDSI Inc.
Billings Bridge Plaza
Box 8004
Ottawa, Ontario
K1G 3H6

David Henry
(613) 733-2100

Services: Consulting civil, mechanical and electrical engineers specializing in the application of renewable energy systems. Distributors of photovoltaic-operated water pumps.

Projects: Product development of solar crop driers and water pumps.

Con-Serve Group Ltd.
18 Gradwell Drive
Scarborough, Ontario
M1M 8M9

Tom Lanczi
(416) 266-9635

Services: Consulting firm specializing in renewable energy and conservation; energy audits; monitoring, thermal performance evaluation; industry surveys.

Projects: NRC; PWC; Ontario Ministry of Energy; Grumman International; Watershed Energy Systems.

Contech E.T.C. Ltd.
503 Administration Building
Carleton University
Ottawa, Ontario
K1S 5B6

A. Brook
(613) 523-9034

Services: Research into chemical (zeolite) storage of solar energy.

Projects: Solar grain dryer study, Agriculture Canada; study of solar/electric systems for long-term heat storage.

DSMA Atcon Ltd.
4195 Dundas Street W.
Toronto, Ontario
M8X 1Y4

I.J. Billington
(416) 239-3011

Services: Consulting engineers specializing in high technology research, thermodynamics, fluid mechanics, systems and controls studies.

Projects: Planning Canadian solar R&D priorities, NRC; development of collector ranking, NRC; Solar Utility Viability Study, CMHC; performance testing for industry.

Energy Conversions Co.
90 Olive Avenue
Toronto, Ontario
M6G 1V1

Arthur Jacobs
(416) 535-1550

Services: Development of linear concentrating collector.

Projects: Test module to monitor linear concentrating collector.

Energy Farms Ltd.
Box 170, R.R. 1
Kingston, Ontario
K7L 4V1

Harry Nybom
(613) 544-1976

Services: Research and development of solar and renewable energy products. Passive solar design.

Projects: Horseshoe Valley project; Unisol residence, Kingston; 3 air systems.

IBI Group
156 Front Street W., 6th Floor
Toronto, Ontario
M5J 2L6

Alan Seymour
(416) 596-1930

Services: Architects, engineers and planners specializing in energy studies.

Projects: Solar monitoring program, National Research Council; "Builders Guide to Energy Efficiency in New Housing,"; "Residential Solar Retrofit in Canada,"Energy, Mines and Resources; "Solar Technics and the Canadian Greenhouse," Agriculture Canada.

Highlands Energy Systems Ltd.
R.R. 5
Orangeville, Ontario
L9W 2Z2

Ben Tripp
(519) 941-5041

Services: Research and product development.

Projects: DHW system; controls.

Middleton Associates
980 Yonge Street
Suite 404
Toronto, Ontario
M4W 2J9

Peter Middleton
(416) 961-5136

Services: Consultants in solar market surveys, economic analysis, and industrial development studies.

Projects: Studies for Ontario government, federal government and private sector.

National Solar Test Facility
Sheridan Park Research Community
Mississauga, Ontario L5K 1B3

Vern Nielson
(416) 822-4114

Services: Official testing of solar collectors to recognized national standards with outdoor rigs and indoor solar simulator.

NRG Consultants Inc.
14 Victoria Avenue N.
Hamilton, Ontario
L8L 5E1

Richard Higgins
(416) 522-4132

Services: Engineering firm specializing in energy conservation.

Ontario Research Foundation
Sheridan Park Research Community
Mississauga, Ontario
L5K 1B3

R.W. Bertram
(416) 822-4111

Services: Research, development and testing of solar components.

Projects: Construction of National Solar Test Facility; design of compound solar collectors; monitoring of solar hot water systems.

Research & Development, cont.

Progressive Energy
R.R. 1
Rockwood, Ontario
N0B 2K0

R. Bruce Leeming
(519) 837-0071

Services: Research into solar to heat cisterns, ponds and runways in commercial fish farming.

Projects: Twin Lake Farms, Rockwood.

Scanada Consultants Ltd.
436 MacLaren Street
Ottawa, Ontario
K2P 0M8

Chris Milne
(613) 236-7179

Services: Engineers specializing in performance prediction and monitoring of passive solar buildings. Solar product development.

T.E.S. Ltd.
2548 Sheffield Road
Ottawa, Ontario
K1G 3V1

Laurin Garland
(613) 741-9402

Services: Engineers and technologists specializing in engineering studies, testing and monitoring.

Projects: Development of DHW monitoring methods, NRC; design of monitoring instrumentation for solar process water system of commercial photographic laboratory; on-site monitoring of residential solar systems.

Waterloo Research Institute
University of Waterloo
Waterloo, Ontario
N2L 3G1

W. Blair Bruce (519) 885-1211

Services: Research and development of flat plate collectors; testing of absorptivity and emissivity of collector surfaces, development of computer programs and system analysis.

Manitoba

Designers

Appin Solar Assoc. Inc.
13-77 Rue Eugénie
Winnipeg, Manitoba
R2H 0X6

George Bowman
(204) 489-5597

Services: Engineers offering energy management, research, planning and passive design services.

The Conserver Group Inc.
320-35 Princess Street
Winnipeg, Manitoba
R3B 1K1

Brian Gaber
(204) 956-2129

Services: Consulting engineers experienced in active system design, feasibility studies, project management and monitoring.

Projects: Perth Whitehall Laundry; Winnipeg Post Office; Treherne Community Pool; Winnipeg Regional Data Centre; McDonald Building; 30 pools; 10 DHW.

E.J. Faraci & Assoc. Ltd.
620-175 Hargrave Street
Winnipeg, Manitoba
R3C 3R8

Ed Faraci
(204) 949-0847

Services: Consulting engineers experienced in active system design for commercial applications.

Projects: Delorraine Community pool and shower facilities; camp showers and maintenance storage garage, Riding Mountain National Park; Historic Resources Laboratory retrofit air system.

Roseisle Building & Design Workshop
General Delivery
Roseisle, Manitoba
R0G 1V0

Jack Cram
(204) 828-3344

Services: Designers and consultants with experience in active and passive design, featuring double-wall construction and air-to-air heat exchangers. Information and educational programs for institutions and organizations.

Projects: 25 Manitoba residences, active and passive, many including hybrid solar greenhouses.

Scouten, Mitchell, Sigurdson & Assoc. Ltd.
300-297 Smith Street
Winnipeg, Manitoba
R3C 1L3

F. Fugate
(204) 942-3111

Services: Consulting engineers with experience in process hot water system design and feasibility studies.

Projects: Gunton Fish Hatchery; RCMP Building, Brandon.

Speers McGonigal Ltd.
345 Higgins Avenue
2nd Floor
Winnipeg, Manitoba
R3A 0V4

E.A. Speers
(204) 947-1740

Services: Design and installation of active and passive solar systems.

Designers, cont.

UNIES Ltd.
1666 Dublin Avenue
Winnipeg, Manitoba
R3H 0H1

G.K. Yuill
(204) 633-6363

Services: Consulting engineers experienced in solar systems design, education and research.

Projects: DND Building, Man.; 2 Public Works Canada Buildings, Man.; DND Building, Moose Jaw, Sask.; 20 other projects from research to policy papers.

W.L. Wardrop & Assoc. Ltd.
300-77 Main Street
Winnipeg, Manitoba
R3C 3H1

R.K. Giercke
(204) 956-0980

Services: Consulting engineers with experience in active and passive design, feasibility studies, and monitoring.

Projects: Waverly Heights/ Castlewood Homes, Winnipeg; monitored NRC solar housing demonstration projects.

Prof. J.D. Welch
66 Thatcher Drive
Winnipeg, Manitoba
R3T 2L3

John Welch
(204) 261-7122

Services: Architectural design consultant and lecturer with experience in passive solar and energy-efficient design.

Projects: University residence; Gilchrist home, Winnipeg; several residences.

Distributors and Dealers

Lawrence Nordstrom Enterprises Ltd.
P.O. Box 90
Sprague, Manitoba
R0A 1Z0

L. Nordstrom
(204) 437-2316

Services: Distributor of L.P.C. solar products.

Sun Creations Ltd.
1066 Pembina Hwy.
Winnipeg, Manitoba
R3T 1Z8

Ben Friesen
(204) 475-8942

Services: Distributors of solar novelties, solar cells, hobby kits and art forms.

Sun Valley Pools Ltd.
1421 Erin Street
Winnipeg, Manitoba
R3E 2S9

Tom Hood
(204) 774-5581

Services: Distributors of Solaroll, Solar Industries and Thermo Solar pool systems, LPC window modules, Grumman and Souris Plastics products.

Projects: DHW and space heating, Dawson residence.

Installers

Black & McDonald Ltd.
301-6 Weston Street
Winnipeg, Manitoba
R3E 3H4

Phil Martin
(204) 786-5776

Services: Mechanical contractors with experience in DHW installation.

Projects: CFB Westwin; St. Andrew's Air Terminal.

Bowyer Boag Limited
1541 Dugald Road
Winnipeg, Manitoba
R2J 0H3

M. Bodner
(204) 224-3295

Services: Mechanical/heating contractors with experience in air system installation.

Projects: Air space heating system, demonstration home.

Master Plumbing & Heating Co. Ltd.
359 Pandora Avenue
Winnipeg, Manitoba
R2C 1M6

Arthur McKenzie
(204) 222-4279

Services: Mechanical contractors with experience in DHW installation.

Projects: Grain Commission, Winnipeg; Sands Storage Building, Winnipeg; Air Terminal Building, North Battleford, Sask; Operations Building, Kenora, Ont; Mechanics Garage, Prince Albert, Sask.

Speers McGonigal Ltd.
(see Designers)

Manufacturers

Heli-Fab
1865 Sargeant Avenue, Bay 16
Winnipeg, Manitoba
R3H 0E2

Ray Haydaman
(204) 774-9602

Services: Manufacturers of Heli-Fab Solar Roller for insulating pool covers.

Natural Energy Systems of Canada
256 Carpathia Road
Winnipeg, Manitoba
R3N 1S9

Brian Gaber
(204) 489-2629

Services: Manufacturers of differential controls primarily for pool systems.

Projects: Ontario Hydro, Atikokan; many pools and residential systems.

Public Information

Roselale Building and Design Workshop
(see Designers)

Solar Energy Society of Canada Inc. (SESCI)
303-870 Cambridge Street
Winnipeg, Manitoba
R3M 3H5

Judy Noble
(204) 284-3076

Services: Head office of national organization devoted to promotion and development of solar technology application and education. Member chapters across Canada.

SESCI Manitoba
% Anna Olson
P.O. Box 164, Station F
Winnipeg, Manitoba
R2L 2A5

Research and Development

UNIES Ltd.
(see Designers)

Prof. J.D. Welch
(see Designers)

Saskatchewan

Designers

Briggs & Assoc. Ltd.
2333 Albert Street
Regina, Saskatchewan
S4P 2V8

Trevor Harle
(306) 352-5638

Services: Design consultants with experience in active systems.

Projects: Marievale School residence, Broadview; Gordon Indian Reserve School, Punnichy.

The Cambrian Engineering Group Ltd.
119 - 105th Street E.
Saskatoon, Saskatchewan
S7N 1Z2

L. Fredericksen
(603) 373-3811

Services: Consulting engineers, designers of active solar systems.

Projects: 1 pool; 1 air system.

Concept Construction Ltd.
2234 Hanselman Avenue
Saskatoon, Saskatchewan
S7L 6A4

Keith Funk
(306) 652-2233

Services: Designers with experience in design and construction of passive residences.

Projects: 150 residences.

Concept Solar Homes Inc.
1141 Athabasca Street W.
Moose Jaw, Saskatchewan
S6H 2E8

Jon van der Raadt
(306) 692-8519

Services: Designers of passive solar homes. Consultants on energy conservation and retrofit construction.

Projects: 3 passive homes; retrofit projects; consultation on 4 homes.

Enercon Consultants Ltd.
2073 Cornwall Street
Regina, Saskatchewan
S4P 2K6

Leland Lange
(306) 585-0022

Services: Consultants and designers with experience in passive home design. Licensing of contractors in building of low-energy housing.

Projects: Pasqua residence, Regina; over 30 passive residences across Canada.

Saskmont Engineering Co. Ltd.
500-2400 College Avenue
Regina, Saskatchewan S4P 1C8

J.P. Huza
(306) 525-8166

Services: Consulting engineers, designers of active solar systems and feasibility studies.

Projects: 4 DHW; 2 process hot water; 1 air system; 1 pool; CAC Building, Montréal.

Sun Centre Systems
Box 2437
Prince Albert, Saskatchewan
S6V 7G3

Barry Headrick
(306) 922-2665

Services: Designers with experience in air system design.

Projects: Wabasca office building, Alta.; Rimbey residence, Alta.; La Ronge residence, Sask.; grain dryer, Watrous, Sask.

Sunhouse Homes Ltd.
5-1945 Scarth Street
Regina, Saskatchewan
S4P 2H2

Henry Lorenzen
(306) 352-4433

Services: Architect, designer of energy-efficient homes with experience in active and passive design. Conservation consultant.

Projects: 20 air systems.

Underwood McLellan Ltd.
2310 Arlington Avenue
Saskatoon, Saskatchewan
S7K 3L6

Paul M. Fung
(306) 652-4220

Services: Consulting engineers with experience in DHW design.

Projects: Buffalo Narrows residence DHW.

Distributors and Dealers

CES Conservation Energy Systems Inc.
Box 8280
Saskatoon, Saskatchewan
S7K 6C6

Rick Olmstead
(306) 665-6030

Services: Manufacturers of air-to-air heat exchangers for residential and light industrial use.

Kenwood Solar Dynamics Inc.
P.O. Box 283
Saskatoon, Saskatchewan
S7K 3L3

Don Lins
(306) 384-1353

Services: Distributors of DHW, pool systems and components for site-assembled systems. Installation service.

Projects: 4 residential systems.

Installers

B.M.L. Ltd.
40 Kress Street
Regina, Saskatchewan
S4P 3W5

Willard Abrahamson
(306) 949-5656

Services: Mechanical contractors with experience in DHW installation.

Projects: Merivale Residence, Broadview; Gordon Residence, Punnichy.

Kenwood Solar Dynamics Inc.
(see Distributors and Dealers)

Monarch Plumbing & Heating Co. Ltd.
145 - 5th Avenue
Regina, Saskatchewan
S4N 5A2

I.H. Richardson
(306) 569-9088

Services: Mechanical contractors with installation experience.

Projects: 4 DHW; 1 pool, Regina.

Thorpe Brothers Ltd.
P.O. Box 130
Prince Albert, Saskatchewan
S6V 5S4

Bill Thorpe
(306) 763-8454

Services: Plumbers, installing first system: DHW, Prince Albert Student Residence.

Manufacturers

Enercon Industries Ltd.
2073 Cornwall Street
Regina, Saskatchewan
S4P 2K6

Dennis Rogoza
(306) 585-0022

Services: Manufacturer of Enercon heat exchanger, window shutter systems, and eutectic salt thermal storage system.

At press time it was learned that Enercon Inc. has changed its name and will henceforth be known as Blackhawk Industries Inc.

Manufacturers, cont.

Passive Solar Products Ltd.
2234 Hanselman Avenue
Saskatoon, Saskatchewan
S7L 6A4

John Nesbitt
(306) 244-7511

Services: Manufacturers and installers of insulating curtain/window systems.

Saskatchewan Minerals
P.O. Box 120
Chaplin, Saskatchewan
S0H 0V0

John Williams
(306) 395-2561

Services: Manufacturers of ENER-G-TRAY, Glauber's salt heat storage trays.

Public Information

SESCI Regina
℅ Ken Kelln
P.O. Box 3959
Regina, Saskatchewan
S4P 3R9

SESCI Northern Saskatchewan
1333 - 2nd Ave. N.
Saskatoon, Saskatchewan
S7K 2E6

SESCI Swift Current
416 Hayes Drive
Swift Current, Saskatchewan
S9H 4H9

Alberta

Designers

Bertbuilt Solar Engineering
201-10025 - 113th Street
Edmonton, Alberta
T5K 2K8

S.B. Bertles
(403) 482-1183

Services: Design consultation on active and passive retrofits, DHW and swimming pool systems.

Projects: 1 residential DHW, Edmonton.

Cheriton Engineering Ltd.
214 Airways Business Plaza
1935 - 32nd Avenue N.E.
Calgary, Alberta
T2E 7C8

M.H. (Sid) Siddiqui
(403) 230-5524

Services: Consulting engineers with experience in DHW and air systems.

Projects: Calgary Map Office; Calgary Post Office.

Cheriton Engineering Ltd.
700 Weber Centre
5555 Calgary Trail
Edmonton, Alberta
T6H 5P9

Dave Panar
(403) 438-3811

Services: Consulting engineers with experience in DHW and air systems.

Projects: Desmarais Office Building; Godderham School, Duffield.

Concepts, Design & Drafting
5-11118 - 124th Street
Edmonton, Alberta
T5M 0J6

Fred Mallach
(403) 452-1969

Services: Architectural technologists with experience in active and passive design.

Projects: Passive residence, Vernon, B.C.; passive residence, Edmonton; greenhouse, St. Albert.

Dirk & Price Engineering Ltd.
625 - 77th Avenue S.E.
Calgary, Alberta
T2H 2B9

Frank Meriwether
(403) 252-0557

Services: Engineers with experience in active system design and feasibility studies.

Projects: Waterton Park pool; Jasper Park pool; Cypress Hill Park pool; Kootenay administration building; 20 pools; 5 DHW.

Jo Tech
1911 - 36th Street S.W.
Calgary, Alberta
T3E 2Y8

Jits Oishi
(403) 246-0141

Services: Engineers with experience in active systems and feasibility studies.

Projects: Jasper Park pool; 2 post offices.

Kananaskis Centre for Environmental Research
University of Calgary
2500 University Drive N.W.
Calgary, Alberta
T2N 1N4

Michael J. Youso
(403) 284-5355

Services: Research and design of thermal and wind systems integrated with conventional systems.

Projects: Energy Kananaskis, integrated community energy systems; Esso Plaza, Calgary.

Tang G. Lee Architect Ltd.
2404 - 25th Avenue N.W.
Calgary, Alberta
T2M 2C5

Tang G. Lee
(403) 289-5015

Services: Architect specializing in active and passive design.

Projects: Calgary Chinese Alliance Church; Southwood United Church; High River Community Centre; Alternate Energy Shelter, Calgary; several residences.

Designers, cont.

T. Lamb McManus & Assoc. Ltd.
10214 - 112th Street
Edmonton, Alberta
T5K 1M5

George Wilkenson
(403) 426-0516

Services: Consulting engineers, designers of active systems and feasibility studies.

Projects: Guntaers Warehouse.

Passive Solar Designs Ltd.
204-10830 - 107th Avenue
Edmonton, Alberta
T5H 0X3

John R. Hughes
(403) 426-3857

Services: Designers specializing in energy-efficient, passive residences and retrofits. Passive solar courses.

Projects: 20 residences.

Prairie Solar Systems Ltd.
204-10830 - 107th Avenue
Edmonton, Alberta
T5H 0X3

Baron Fowler
(403) 428-1680

Services: Designers of energy-efficient and passive residences and retrofits.

Projects: Northern Alberta residences.

Reid, Crowther & Partners Ltd.
7410 Blackfoot Trail S.E.
Calgary, Alberta
T2H 1X9

P. Fu
(403) 283-3191

Services: Consulting engineers, designers of liquid active solar systems and feasibility studies.

Gilbert Rekken & Assoc. Ltd.
10235-124th Street
Suite 105
Edmonton, Alberta
T5N 1P9

Gilbert Rekken
(403) 482-5611

Services: Consulting engineers with experience in active system design.

Projects: Research House ER-1; Post Office.

Saskmont Engineering Co. Ltd.
201-10408 - 124th Street
Edmonton, Alberta
T5N 1R5

Stanley Hayden
(403) 482-7351

Services: Consulting engineers with experience in DHW system design and feasibility studies.

Projects: Redwater residence; Red Deer office study.

D.E. Schaefer Architect Ltd.
11207 - 103th Avenue
Edmonton, Alberta
T5K 2V9

David Schaefer
(403) 426-7414

Services: Architect with experience in energy-efficient passive and hybrid design.

Projects: Provincial building, Lac LeBiche; several residences.

Sol-Tech Housing Calgary Ltd.
R.R. 1
DeWinton, Alberta
T0L 0X0

W.L. Crist
(403) 938-7945

Services: Engineers specializing in passive design and construction.

Projects: 5 passive residences; 3-unit condominium.

Sun Energy Design Assoc. Ltd.
26 New Street S.E.
Calgary, Alberta
T2G 3X9

Jorg Ostrowski
(403) 266-1208

Services: Designers with experience in energy-efficient and passive solar design, new and retrofit.

Projects: Curtis residence; Moose Run Sun Home; Stampede Sunseed Demonstration Building; private residences.

Sun Energy Engineering Ltd.
26 New Street S.E.
Calgary, Alberta
T2G 3X9

John E. Fricker
(403) 263-6763

Services: Engineers with experience in active system design, specializing in radiant floor slab heating.

Projects: Alternative Energy Shelter Research and Testing Station; Esso Resources Tower, Calgary.

Sunergy Systems Ltd.
R.R. 2
Carstairs, Alberta
T0M 0N0

Michael Kerfoot
(403) 335-4988

Services: Architects and consultants on energy-efficient and passive solar systems. Solar greenhouse workshops. Insulated window blinds.

Projects: Sunseed solar demonstration; attached solar greenhouses; DHW systems; drum wall and Trombe wall systems; 3 residences with no fossil fuel auxiliary systems.

Underwood McLellan Ltd.
2540 Kensington Road N.W.
Calgary, Alberta
T2N 3S3

R.G. Molnar
(403) 283-4961

Services: Consulting engineers with experience in active solar system design.

Projects: Nu-West Home, Calgary.

W.L. Wardrop & Assoc. Ltd.
Mayfield Square 1
202-10468 Mayfield Square
Edmonton, Alberta
T5P 4C8

Vic Weins
(403) 483-0461

Services: Consulting engineers with solar systems; monitoring experience.

Projects: One system monitored.

Weibe, Forest, Tibbs Consultants Ltd.
604-24A Street N.W.
Calgary, Alberta
T2N 2S4

John Weibe
(403) 283-6658

Services: Design consultants with experience in active and passive design.

Projects: Crestview Lodge, Pincher Creek; Rundlehorn Village, Calgary.

Distributors and Dealers

Encotech Energy Systems Ltd.
10062 - 80th Avenue
Edmonton, Alberta
T6E 1T5

Chris Bamford
(403) 482-1086

Services: Retail and wholesale of solar and energy conserving products.

Solar Engineering Group Ltd.
Box 876, Station J
Calgary, Alberta
T2A 6A6

Nabil T. Mansour
(403) 247-0047

Services: Distributors of energy conservation products and micro computer programs. Consulting engineers with experience in energy conservation and solar design.

The Wooden Ewe Ltd.
Box 1387
Fairview, Alberta
T0H 1L0

Mark A. Craft
(403) 835-4216

Services: Distributors of products and hardware for passive solar houses: glazing, insulation, heat exchangers.

Installers

Ferreis' Plumbing & Heating Ltd.
P.O. Box 68
Box Island, Alberta
T0K 0G0

George Hanson
(403) 545-2242

Services: Plumber with solar theory course.

Projects: 1 pool, Bow Island.

Fritz Plumbing and Service Ltd.
10003 - 69th Avenue
Edmonton, Alberta
T6E 0T1

Felix Fritz
(403) 433-3124

Services: Plumbing contractor.

Projects: 1 hot tub, own home.

Fuller and Knowles Co. Ltd.
P.O. Box 5680
17th Street and 73rd Avenue
Edmonton, Alberta

P. Ondrus
(403) 464-2022

Services: Mechanical contractor. Union.

Projects: 1 DHW; 1 air system.

Meccon Installations Ltd.
3609 - 74th Avenue
Edmonton, Alberta
T6B 2T7

Robert Gaudet
(403) 468-1828

Services: Mechanical contractor. Union.

Projects: 1 DHW, Imperial Oil, Nisku.

Wil Mechanical Ltd.
4411 - 68th Avenue
P.O. Box 5633, Station L
Edmonton, Alberta
T6C 4G7

Ed Kozuback
(403) 466-1127

Services: Mechanical contractors with experience in pool installations. Union.

Projects: 2 pools.

Public Information

Alberta Research Council
(see Research and Development)

J.M. Lebel Enterprises Ltd.
10372 - 60th Avenue
Edmonton, Alberta
T6H 1G9

John Lebel
(403) 436-8205

Services: Publisher of comprehensive school text book: "Solar Energy: Solar Education for the 80's".

Passive Solar Designs Ltd.
(see Designers)

SESCI Calgary
P.O. Box 105
204-223 - 12th Ave. S.W.
Calgary, Alberta
T2R 0G9

SESCI Lethbridge
% Larry Hides
78 Rutgers Crescent W.
Lethbridge, Alberta
T1K 4S9

SESCI Northern Alberta
P.O. Box 11062
Edmonton, Alberta
T5J 3K4

Solar Educational Services
3710 Cedaville Drive S.W.
Calgary, Alberta
T2W 3J8

Ken Holmes
(403) 238-3774

Services: Organization of seminars for contractors and developers.

Projects: 1980 SESCI conference; workshops in B.C., Alberta and Ontario.

Sunergy Systems Ltd.
(see Designers)

University of Calgary
Faculty of Environmental Design
Calgary, Alberta
T2N 1N4

Tang G. Lee
(403) 284-6608

Services: Solar courses offered to architects, engineers, designers, contractors and trade unions.

Research and Development

Alberta Research Council
Solar & Wind Energy Research Program (SWERP)
4445 Calgary Trail South
Edmonton, Alberta
T6H 5R7

H.B. Luft
K.D. Beliveau
(403) 438-1808

Services: Assessment of wind and solar resources in Alberta, demonstration programs, databank on wind and solar energy, computerized literature searches, reference index and general information packages available.

Projects: Inventory of solar and wind research projects in Alberta; list of Alberta companies active in solar market.

Dynamic Mining Exploration Ltd.
870 Three Calgary Place
355 - 4th Avenue S.W.
Calgary, Alberta
T2P 0J1

Barbara C. Gray
(403) 264-8750

Services: Research and development of solar components, air collector with phase change storage.

Jensen Engineering Ltd.
P.O. Box 1781
Olds, Alberta
T0M 1P0

N.E. Jensen
(403) 556-8755

Services: Engineers and agrologists specializing in agricultural applications of renewable energy systems; seminars and applied research.

Projects: Energy research projects for federal and provincial governments and commercial agencies.

Kananaskis Centre for Environmental Research
(see Designers)

British Columbia

Designers

Ascent Structures Ltd.
195 Olive Street
Victoria, British Columbia
V8S 3H4

Gil Parker
(604) 386-9132

Services: Consulting engineers with experience in active and passive design. Specialists in design of collector racks.

Projects: Rack design for Waterton Park and White Rock Apartments; passive envelope residence, Victoria; Naden pool/gym complex.

Aubert & Yardley Assoc.
North Park Plaza
Suite 201 - 1551 Estevan Road
Nanaimo, British Columbia
V9S 3Y5

Jonathan Yardley
(604) 795-5813

Services: Architects and planners with experience in design of active and passive energy-efficient houses and small commercial buildings.

Projects: Martin residence, Ganges: active system and Trombe wall.

Con Sol Tech
7650 Wright Street
Burnaby, British Columbia
V3N 3W9

E.E. Laks
(604) 521-7150

Services: Engineer, designer of passive solar homes.

Projects: Kartasheff passive residence, Surrey.

The Drawing-Room Graphic Services Ltd.
P.O. Box 86627
North Vancouver, British Columbia
V7L 4L2

Richard Kadulski
(604) 689-1841

Services: Architects with experience in passive solar design. Publishers of SOLPLAN series of solar manuals.

Projects: 7 passive residences; over 12 SOLPLAN residences across Canada.

ECON
1751 Nanaimo Street
Vancouver, British Columbia
V5N 5C1

Ken Cooper
(604) 253-8380

Services: Engineers with experience in passive design, solar monitoring, and computer performance simulation.

Projects: Kitsun Townhouse monitoring; Logan Townhouse monitoring.

Maple Ridge Solar Ltd.
(see Distributors)

William McCreery Architects
1655 Duranleau Street
Granville Island
Vancouver, British Columbia
V6H 3S3

Edward J. deGrey
(604) 681-0276

Services: Architects with experience in energy-efficient, active and passive design.

Projects: Granville Island Solar Heating Project; 10 residences/apartments.

Parasol Engineering Inc.
P.O. Box 34157
Vancouver, British Columbia
V6J 4N1

W.A Bakker
(604) 224-3301

Services: Engineers offering computer-aided design of active and passive systems and components.

Projects: Computer simulation program for testing flat plate collectors.

Reid, Crowther & Partners Ltd.
200 - 260 W. Esplanade Street
North Vancouver, British Columbia
V7M 3G7

E.I. Mackie
(604) 986-6181

Services: Consulting engineers, designers of solar DHW and pool systems.

Projects: 2 pools; 3 DHW; 20 feasibility studies.

John Richardson Assoc.
P.O. Box 35643
Vancouver, British Columbia
V6M 4G9

John Richardson
(604) 263-9446

Services: Engineers with experience in active system design.

Projects: Kitsun townhouses; Granville Island Solar Project; Mission Medium Security Institution; Raymur Housing Complex; 4 DHW; 1 pool; 1 process hot water; 1 air system.

S-Matrix Enterprises Ltd.
516-675 W. Hastings Street
Vancouver, British Columbia
V6B 1N2

Robert Selvage
(604) 669-4310

Services: Energy analysts offering engineering design, project management, etc. using computer simulation.

Projects: Tumbler Ridge; Champlain Heights, Vancouver.

David Smith Mechanical Consultants Ltd.
P.O. Box 91534
West Vancouver, British Columbia

J.D. Smith
(604) 922-4010

Services: Consulting engineer with experience in active and passive design.

Projects: Chelcoten School, Rack Creek residence; 2 passive residences, Jasper; McDonald townhouses, Vancouver; Courthouse, St. Catharines, Ontario.

Solace Energy Centre
2425 Main Street
Vancouver, British Columbia
V5T 3E1

Bob Isaac
(604) 879-5258

Services: Architects and engineers offering consultation in renewable energy options. Distributors and installers of Smith Storage Tanks, Solarsystems collectors, Thermo Solar DHW systems, ARCO photovoltaic panels.

Projects: 150 pools; 50 DHW; 100 passive designs.

Solar Applications & Research
3683 West 4th Avenue
Vancouver, British Columbia
V6R 1P2

Chris Mattock
(604) 733-5631

Services: Engineers and architects with a wide range of experience in active and passive design, monitoring and analysis, research, and practical solar workshops.

Projects: Kitsun passive solar townhouses; City of Vancouver Energy Information Centre; 14 passive and hybrid residences; 25 solar greenhouses; more than 100 workshops and professional seminars.

Designers, cont.

The Solar Group Architects
504 Davie Street
Vancouver, British Columbia
V6B 2G4

Robert H. Isaac-Renton
(604) 682-1344

Services: Architects specializing in energy efficient design, thermal analysis and computer simulation. Active and passive system design for residential and commercial applications.

Projects: Solar church and school, Mission; over 40 residential, institutional and commercial projects.

Solarsystems Industries Ltd.
(see Manufacturers)

Sol-Way Engineering Ltd.
(see Manufacturers)

Suntek Solar Heating Systems Ltd.
6720 Williams Road
Richmond, British Columbia
V7R 1K5

Norm Trimble
(604) 271-9127

Services: Engineer and mechanical contractor specializing in active system design and installation.

Projects: White Rock apartment building; 50 pools; 80 DHW; 3 air systems.

Sunwise Systems
876 Nicola Street
Kamloops, British Columbia
V2C 2R7

Chris Bartsch
(604) 372-2162

Services: Design consultants with experience in pool and air systems and passive design.

Projects: Parken and Brown residences, Kamloops; 2 pools; 2 air systems.

D.W. Thomson Consultants Ltd.
1690 W. Broadway
Vancouver, British Columbia
V6J 1X9

F.H. Neilsen
(604) 731-4921

Services: Consulting engineers with experience in active solar system design, feasibility studies and monitoring.

Projects: Pineridge Elementary School; Institute of Ocean Sciences; 5 DHW; 1 air system.

Distributors and Dealers

Ark Solar Products
2676 Quadra Street
Victoria, British Columbia
V8T 4E4

Gil Parker
(604) 386-7643

Services: Distributors and installers of solar systems and components, primarily Solarsystems Industries products.

Projects: 20 pools; 43 DHW; 7 space heating systems.

Bydand Solar Centre
204-8475 Ontario Street
Vancouver, British Columbia
V5X 3E8

Doug Gordon
(604) 731-4171

Services: Distributors and installers of glazed and unglazed panels for pools and DHW systems. Products include Fafco Sunspot, Grundfos and Delta T.

Projects: BC Energy Commission Demonstration Project; Grove Condominiums; Bedwell Harbour Resort; Okanagan Park Development; 400 pools; 52 DHW; 3 process hot water; 2 air systems.

Careful Eco Systems Ltd.
Box 1212
Whaletown, British Columbia
V0P 1Z0

Alex Nicholl
(604) 935-6474

Services: Distributors of Arco 30-watt photovoltaic panels and lead acid battery storage systems. System design and installation.

Projects: Welch residence, Surge Narrows (30 watt); Mottershead residence, Surge Narrows (30 watt); Snow residence, Cortes Is. (30 watt); Walton residence, Whaletown (60 watt); Kinmont residence, Cortes Is. (30 watt).

Fleetwood Energy Products
15797 - 92nd Avenue
Surrey, British Columbia
V3R 1C4

Roy Hetherington
(604) 588-5877

Services: Distributor of Myson pumps.

Glazier Plumbing & Heating Ltd.
(see Installers)

Maple Ridge Solar Ltd.
20120 Patterson Avenue
Maple Ridge, British Columbia
V2X 2P4

Ron Sawchenko
(604) 465-8511

Services: Distributors of Fafco pool systems, pool blankets and blanket rollers, and air-to-air heat exchangers. Active system and greenhouse design. Manufacturers of Suncatcher DHW systems.

Projects: 70 active systems; 4 greenhouses.

Pacific Solar Home and Energy Retrofit Ltd.
(see Installers)

Solace Energy Centre
(see Designers)

Sun Dial Solar Systems
(see Installers)

Sun God Solar Systems
2215 Coquitlam Avenue
Port Coquitlam, British Columbia
V3B 1J6

Doug McKeen
(604) 941-5812

Services: Distributors of solar systems and components including Petro Sun pool systems, Heliotrope General control and Solar Industries systems. Installation service.

Projects: 220 pools; 3 DHW.

Tri Energy Tech Inc.
1540-D Hwy. 97 S.
Kelowna, British Columbia
V1Z 1A8

Ken Farrish
(604) 769-3080

Services: Distributor of Solaroll, with 50 dealers in the West.

Installers

Ark Solar Products
(see Distributors and Dealers)

Bydand Solar Centre
(see Distributors and Dealers)

Earico Mechanical Contractors Ltd.
R.R. 4, Finnigan Site
Prince George, British Columbia
V2N 2J2

J. Earl
(604) 562-3135

Services: Mechanical contractors with experience in all types of solar system installation. Union.

Projects: Prototype residence, Prince George.

Enersave Industries
Enersave House
Box 1600
Vernon, British Columbia
V1T 8C2

Dennis Milligan
(604) 542-0186

Services: Installation of pool systems.

Projects: 92 residential pools; Armstrong Municipal pool; Enersave House; solar residence Vernon; 1 DHW; 1 food drying system.

Installers, cont.

Glazier Plumbing & Heating Ltd.
4521 Victoria Quay
Port Alberni, British Columbia
V9Y 6G2

Don and Alice Sams
(604) 723-7213

Services: Mechanical contractors with experience in DHW and pool installation. Distributors of Sunglo collectors.

Projects: 1 DHW; 4 pools.

Highland Plumbing & Heating
P.O. Box 4185, Station A
Victoria, British Columbia
V8X 3X8

John Fyfe
(604) 382-3950

Services: Plumbing and heating contractor. Union.

Projects: 1 air space system, Victoria.

Kelowna Ind. Mechanical Ltd.
591 Gaston Avenue
Kelowna, British Columbia
V1Y 7E6

Steve Barnick
(604) 763-8032

Services: Mechanical contractors with experience in supply, installation and maintenance of solar systems.

Projects: Several pool and DHW systems.

Pacific Solar Home and Energy Retrofit Ltd.
2240 Jeffs Road
Box 132
Nanaimo, British Columbia
V9R 5K4

Laurie Gourlay
(604) 758-3711

Services: Installers and suppliers of pool and DHW systems.

Projects: 1 DHW.

Premier Plumbing & Heating Ltd.
3-1125 Industrial Road
Cranbrook, British Columbia
V1C 5E3

Jim Sims
(604) 489-4131

Services: Plumbing and heating contractor with experience in DHW installation.

Projects: 1 pool; 1 DHW.

Solray Plumbing & Heating
Site 11, C-79, R.R. 3
Vernon, British Columbia
V1T 6L6

Roy Ott
(604) 542-4102

Services: Plumbing and heating contractor with experience in pool and DHW system installation.

Projects: 10 pools; 12 DHW; 1 air system.

Sun Dial Solar Systems
203-3749 Shelbourne Street
Victoria, British Columbia
V8P 5N4

Gerald Hoffman
(604) 477-3211

Services: Installers and suppliers of pool and DHW systems.

Sun God Solar Systems
(see Distributors and Dealers)

Suntek Solar Heating Systems Ltd.
(see Designers)

Total Mechanical Systems
1-1753 Dolphin Avenue
Kelowna, British Columbia
V1Y 8A6

Garnet Clark
(604) 860-9585

Services: Mechanical contractors. Union.

Projects: 2 pools; 2 DHW.

Manufacturers

Rocky of B.C. Leisure Ltd.
1372 Main Street
North Vancouver, British Columbia
V7J 1C7

(604) 985-0525

Services: Manufacturers of Rocky's Easy-Roller for insulating pool covers.

Solarsystems Industries Ltd.
2-11771 Horseshoe Way
Richmond, British Columbia
V7A 4S5

E.W. Hoffmann
(604) 271-2621

Services: Manufacturer of liquid collectors, unglazed pool collectors, drain back DHW systems, storage tanks selective copper strip absorbers, differential controllers, and pool systems. System design and installation. Distributors of Rho Sigma monitoring equipment.

Projects: Hoffmann residence; Pineridge School; Surrey Tax Centre; Granville Island; Martin Manor Apartment Building; Chilcotin Indian School; 100 pools; 130 DHW; 5 process hot water systems.

Sol-Way Solar Engineering Ltd.
942 S.W. Marine Drive
Suite 30
Vancouver, British Columbia
V6P 5Z2

J.L. Richardson
(604) 324-3327

Services: Manufacturer of Sol-Way collectors, tank-in-tank heat exchanger and thermosyphon DHW systems. System design and installation.

Projects: Kitsilano Townhouses; 11 DHW, B.C. Government; Grandview Housing; Mission Penitentiary.

Vortek Industries Ltd.
1820 Pandora Street
Vancouver, British Columbia
V5L 1M5

G.G. Albach
(604) 251-2451

Services: Solar simulator test facility.

Projects: National Solar Test Facility, Mississauga, Ontario.

Public Information

B.C. Hydro
625 Howe Street, 7th Floor
Vancouver, British Columbia
V6C 2T6

Stuart F. Leslie
(604) 663-3274

Services: Advice on solar use in BC environment. Booklets on energy efficiency, DHW and other solar applications.

Projects: Several solar thermal projects; photovoltaic project integrated to Hydro grid.

The Drawing-Room Graphic Services Ltd.
(see Designers)

Solar Applications and Research
(see Designers)

SESCI Okanagan
P.O. Box 2321, Station R
Kelowna, British Columbia
V1X 6A5

SESCI Vancouver
504 Davie Street
Vancouver, British Columbia
V6B 2G4

SESCI Vancouver Island
P.O. Box 6003, Station C
Victoria, British Columbia
V5T 2V9

Product Guide

1. Systems

1.1 Active Space Heating Systems

ISIS Solar Heater

The ISIS solar heater unit fits into a south-facing window. The collector is double-glazed with fibreglass and the absorber is fabricated from pre-coated black enamel aluminum. The container is aluminum with urethane insulation. The 914mm × 2436mm package includes 110 volt blower, differential controller, dampers, mounting brackets, and insulation filler. The dimensions of the unit are 914mm × 2438mm. Options include a photovoltaic cell to operate air blower.

Made in USA

Manufactured by:

Impac Corp.

312 Blondeau Street
P.O. Box 365
Keokuk, IA
USA 52632

Marty Fox
(319) 524-3304

Distributed by:

Suntrap Solar Products

P.O. Box 384
Guelph, Ontario
N1H 6K5

Leo A. Rodrigues
(519) 822-2762

LPC Solar Panel Heater

The LPC Solar Panel Heater consists of a double fibreglass glazed air flat plate collector directly attached through a south-facing window to the outside wall. The absorber is a painted ribbed steel. The package includes a control unit and blower. Model 40 is 1295mm × 3073mm, Model 32 is 1295mm × 2464mm.

Made in USA

Manufactured by:

LPC Inc.

New Richland, MN
USA 56072

Distributed by:

Sun Valley Pools Ltd.

1421 Erin Street
Winnipeg, Manitoba
R3E 2S9

Tom Hood
(204) 774-5581

Lawrence Nordstrom Enterprises Ltd.

P.O. Box 60
Sprague, Manitoba
R0A 1Z0

(204) 437-2316

SOL 880 Space Heating System

Manufactured by:

Solarsystems Industries Ltd.

2-11771 Horseshoe Way
Richmond, B.C.
V7A 4S5

Blair D. Salter
(604) 271-2621

The Solarsystems Sol 880 active space system is designed to work in conjunction with a conventional-fuel air heating system. The components include SOL 100 collectors, SOL 750 storage tank, heat exchanger for domestic hot water, heat exchanger for insertion in hot air duct, pumps, SOL 900 differential controller, two-stage room thermostat, and control relays. The system is custom-designed and adapted for each installation.

Made in Canada

Solar Economizer

The Solar Economizer is an add-on unit which is installed in a south-facing window. The glazing is acrylic and the absorber and container are styrene. Collector area is 813mm x 1118mm. The package includes blower, differential controller, and mounting hardware.

Made in USA

Manufactured by:

Solar Micro

11 Carmans Road E.,
Farmingdale, NY
USA 11735

Jeff Langdale
(212) 343-0706

Distributed by:

Trivco Promotions Inc.

2050 Ellesmere Road
Units 10 & 11
Scarborough, Ontario
M1H 3A9

Ron McHugh
(416) 438-4461

Watershed Solar Air Heating System

Manufactured by:

Watershed Energy Systems Ltd.

97 Six Point Road
Etobicoke, Ontario
M8Z 2X3

Bruce Morton
(416) 233-3241

The Watershed Solar Air Heating System consists of three major parts: A100 collectors, mounting brackets and glazing caps; site-built, wood frame, insulated rock storage unit; and air handling unit including blower, dampers, and controls. Insulated duct work is also included. A150 series collectors are provided as an option for specialized applications. The system works with a conventional furnace for back-up heat to meet both space heating and water heating requirements.

Made in Canada

1.2 Domestic Hot Water Systems

Amherst Closed Loop

The Amherst DHW package is a double-tank, double-pump closed loop system incorporating Amherst 100 liquid flat plate collectors with internal headers. The system components are Noranda double-wall heat exchangers, a John Woods 805 preheat storage tank, 2 Armstrong S15 pumps and a Conserval 52 differential controller. The liquid-handling components are pre-assembled. Recommended heat transfer fluid is 55/45 ethylene glycol/water solution.

Made in Canada

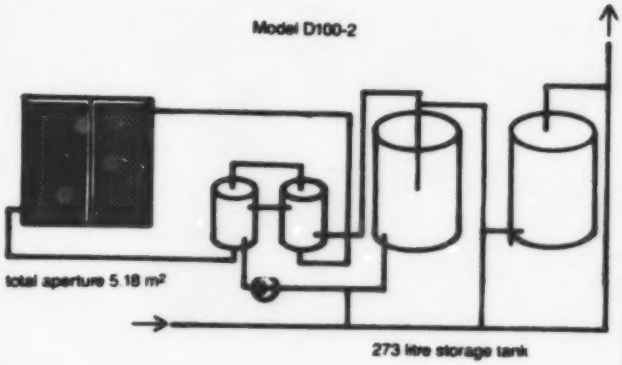
Solar Product Data Sheet 28

Manufactured by:

Amherst Renewable Energies Ltd.

1070 Morrison Drive
Ottawa, Ontario
K2H 8K7

(613) 820-3274



Atlantic Solar One Big Panel

The One Big Panel DHW package is a closed loop system. The collector glazing is polycarbonate Quatex and the absorber is aluminum plate with copper risers. The system components are a Grundfos pump, Delta T-80 controls, Noranda heat exchanger and John Wood tank. The single panel is 2.44m × 2.44m (8 ft. × 8 ft.).

Made in Canada

Manufactured by:

Atlantic Solar Products Ltd.

P.O. Box 195
Guysborough, Nova Scotia
B0H 1G0

Mark Haynes
(902) 533-2835

Sunspot Closed Loop

The Sunspot DHW package is a single-pump, double-tank closed loop system incorporating ThermoSolar liquid flat plate collectors with internal headers. System components are A.O. Smith storage tank with integral heat exchanger, Grundfos UPS 20-42 pump, and Delta T DDT92 differential controller. Liquid handling components are site-assembled. Recommended heat transfer fluid is Dowfrost propylene glycol.

Made in Canada

Manufactured by:

Byland Solar Centre Ltd.

Box 33744
Vancouver, British Columbia
V6J 4L6

Doug Gordon
(604) 731-4171

EnerSource Closed Loop

The EnerSource DHW package is a closed loop, double-pump system. The collectors are single glazed with reinforced polyester. The copper plate-and-tube absorber is selectively coated with black chrome. The system components are Armstrong S15 pumps, Noranda heat exchanger and EnerSource differential controllers. The recommended heat transfer fluid is a 50/50 solution of propylene glycol.

Made in Canada

Manufactured by:

EnerSource Inc.

P.O. Box 1688
St. Catharines, Ontario
L2R 7K1

Richard Copeland
(416) 686-6267

Passive Solar Water Heater

This passive solar water heater comes as a prefabricated system or as a kit of components for site assembly. The thermosyphon air collectors are sized to suit locally-available glazing and consist of a formed aluminum or finned absorber plate, a film glazing frame or glass supports, and flashing. A finned coil heat exchanger at the top of the collectors transfers solar heat to the domestic water. Design services are offered.

Made in Canada

Manufactured by:

Jenkin's Solar Development

R.R. #2
Peterborough, Ontario
K9J 6X3

Ernie Jenkins
(705) 745-9480

Lennox SMS3 Solarmate

The Lennox Solarmate DHW package is a double-pump closed loop system incorporating the Lennox SC3-32S liquid flat plate collector with external headers. The pre-assembled liquid handling module contains two pumps, a fin-and-tube heat exchanger, expansion tank, valves and differential controller. The system is designed for use with a single tank or as preheat in a two-tank system. Tanks are not included.

Made in USA

Distributed by:

Lennox Industries (Canada) Ltd.

400 Norris Glen Road
Etobicoke, Ontario
M9C 1H5

Rody Parker
(416) 621-9302

Nortec Closed Loop

The Nortec DHW package is a double-pump, double-tank, closed loop system incorporating Nortec Hi-Y liquid flat plate collectors with external manifolds. A separate intermediate loop with an external Helio-coil heat exchanger heats the domestic water in a conventional hot water tank, which is connected in series. Controls come in a pre-assembled "Unipack" module. Recommended heat transfer fluid is Dowfrost NT.

Made in Canada

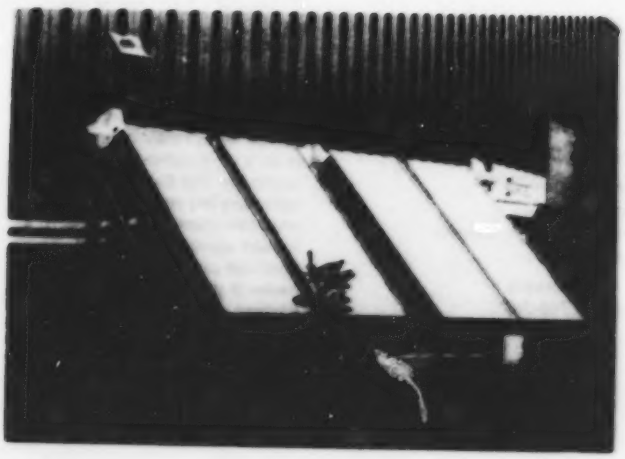
Solar Product Data Sheet 17

Manufactured by:

Nortec Solar Industries Inc.

P.O. Box 760
Manotick, Ontario
K0A 2N0

Jim Ramsden
(613) 692-2513



Sun Catcher Pressurized Drain Back

The Sun Catcher DHW package is a pressurized drain back system incorporating Sun Catcher liquid flat plate collectors. The system components are Rheem tank, Delta T differential controller, and Myson pump. Water at city supply pressure is circulated through the collectors and is drained down with compressed air. The system does not use a heat exchanger.

Made in Canada

Manufactured by:

Maple Ridge Solar Ltd.

20120 Patterson Avenue
Maple Ridge, British Columbia
V2X 2P4

Ron Sawchenko
(604) 465-8511

Petro-Sun Closed Loop

The Petro-Sun closed loop DHW package is a single-tank, single-pump, system incorporating Thermo Solar liquid flat plate collectors with internal headers. System components are a Ford storage tank with internal copper fin heat exchanger, a Taco Solar Circulator 008-F2 and an Independent Energy C-30 differential controller. Liquid handling system is site-assembled. Heat transfer fluid is Aquasol 60NT. In retrofit applications, the system is installed in series with a conventional DHW system.

Made in Canada

Solar Product Data Sheet 22

Manufactured by:

Petro-Sun Inc.

Thermo Solar Division
2290 de la Métropole
Longueuil, Québec
J4G 1E6

(514) 670-8043

Petro-Sun Drain Back

The Petro-Sun drain back DHW package is a double-tank, double-pump system incorporating Thermo Solar liquid flat plate collectors with internal headers. System components are a Ford tank with a custom heat exchanger, an Independent Energy C-30 differential controller, Taco 102B and Grundfos UP25-64SG pumps. Control package is pre-plumbed and pre-wired. The system is open to atmospheric pressure and relies on gravity to prevent the collector fluid from freezing. Solar storage tank, not supplied by Petro-Sun, is any standard hot water tank. Heat transfer fluid is tap water. In retrofit applications, the system is installed in series with a conventional hot water tank; however, if the existing tank has too small a capacity, an additional storage tank may be required.

Made in Canada

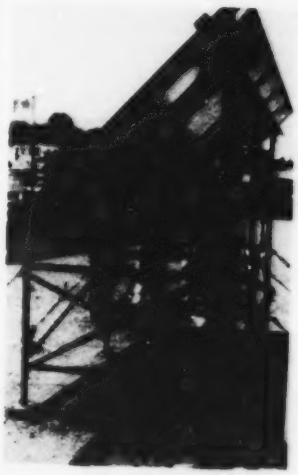
Solar Product Data Sheet 25

Manufactured by:

Petro-Sun Inc.

Thermo Solar Division
2290 de la Métropole
Longueuil, Québec
J4G 1E6

(514) 670-8043



Petro-Sun Recirculation

The Petro-Sun recirculation DHW system is an open loop system designed for warm climates where freezing conditions are seldom encountered. Under freezing conditions, a sensor within the collector activates the pump, and warm water from the tank is circulated through the system. The major system components are a Grundfos or Taco pump and a Thermo Solar TS-50 differential temperature controller. Various collector sizes and tanks are available.

Made in Canada

Manufactured by:

Petro-Sun Inc.

Thermo Solar Division
2290 de la Métropole
Longueuil, Québec
J4G 1E6

(514) 670-8043

Petro-Sun Thermosyphon

The Petro-Sun thermosyphon DHW system is a pre-packaged system which incorporates modified thermosyphon Petro-Sun collectors. The package includes glass-lined tank, pressure relief valve, mounting rack, insulation, hood over tank with reflector, and plumbing connections. The system is designed for non-freezing climates although there are applications in Canada, such as locating the DHW system within a greenhouse or using the system for a summer cottage.

Made in Canada

Manufactured by:

Petro-Sun Inc.

Thermo Solar Division
2290 de la Métropole
Longueuil, Québec
J4G 1E6

(514) 670-8043

Solaquair Closed Loop

The Solaquair closed loop DHW package is a pre-heat system with an aluminum wrap heat exchanger attached to galvanized steel tank. Collectors are double-glazed Tedlar, flattened brass tube absorber contained in an aluminum-extruded casing. The handling system includes pump, Honeywell differential controller, expansion tank, and valves. The heat transfer fluid is ethylene glycol.

Made in Canada

Manufactured by:
Solaquair Corp.
111 Merton Street
Toronto, Ontario
M4S 1A8
Frank Sloan
(416) 486-7108

Sun-Saver

The Sun-Saver DHW system uses Solar Panel air collectors with low-iron glass and a black painted galvanized steel absorber. The system uses an air-to-water heat exchanger and a Heliotrope differential controller.

Made in Canada

Manufactured by:
Solarpanels Ltd.
3327D Mainway, Box 1025
Burlington, Ontario
L7P 3S9
Don Adkinson
(416) 335-4713

SOL 800 Drain Back

The Solarsystems DHW package is a double-tank, single-pump, drain back system incorporating SOL 100 liquid flat plate collectors with internal headers. System components are a SOL 710 storage tank with internal copper coil heat exchanger, SOL 900 differential controller, Richdel R798 or Hartell CPPS-45H-1 pumps. The liquid handling unit is site-assembled. The heat transfer fluid is tap water.

Made in Canada

Solar Product Data Sheet 19

Manufactured by:
Solarsystems Industries Ltd.
2-11771 Horseshoe Way
Richmond, British Columbia
V7A 4S5
E.W. Hoffmann
(604) 271-2621

SOL 860 Drain Down

The Solarsystems SOL 860 DHW system is a single-tank, single-pump drain down system incorporating SOL 100 liquid flat plate collectors with internal headers. The system components are a SOL 740 storage tank, SOL 900 differential controller, and a Richdel R798 pump. The liquid handling unit is site-assembled. No heat exchanger or transfer fluid is used.

Made in Canada

Manufactured by:
Solarsystems Industries Ltd.
2-11771 Horseshoe Way
Richmond, British Columbia
V7A 4S5
E.W. Hoffmann
(604) 271-2621

SOL 870 Thermosyphon

The Solarsystems SOL 870 DHW package is a thermosyphon system incorporating SOL 100 collectors with internal headers and a SOL 710 storage tank with an additional internal heat exchanger. The storage tank must be located above the collectors. The heat transfer fluid is glycol.

Made in Canada

Manufactured by:
Solarsystems Industries Ltd.
2-11771 Horseshoe Way
Richmond, British Columbia
V7A 4S5
E.W. Hoffmann
(604) 271-2621

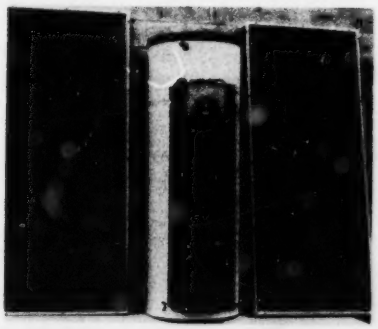
Solartech DB1 Drain Back

The Solartech DB1 DHW package is a double-pump, double-tank drain back system incorporating S-37 liquid flat plate collectors with internal headers. System components include glass-lined drain back and storage tanks, single-wall tube-in-shell heat exchanger, two Grundfos pumps, and Solartech DB controller. The liquid handling components are pre-plumbed in a single unit which is mounted on top of the two stacked tanks to form a single jacketed package. Heat transfer fluid is softened water.

Made in Canada

Manufactured by:
Solartech Ltd.
39 Cranfield Road
Toronto, Ontario
M4B 3H6
(416) 752-4990

Solar Product Data Sheet 39



Solartech QMAX Drain Back

The Solartech QMAX DHW package is a double-pump, double-tank, drain back system incorporating Solartech evacuated tube collectors with integral external headers. System components include glass-lined drain back and storage tanks, single-wall tube-in-shell heat exchanger, two Grundfos pumps, and Solartech DB controller. The liquid handling components are pre-plumbed in a separate package. Heat transfer liquid is softened water.

Made in Canada

Solar Product Data Sheet 31

Manufactured by:
Solartech Ltd.
39 Cranfield Road
Toronto, Ontario
M4B 3H6
(416) 752-4990

Solar World Closed Loop

The Solar World DHW package is a single-pump, single-tank closed loop system incorporating Econo Solar liquid flat plate collectors with internal headers, a Ford tank with integral heat exchanger, Taco pump and Conserval differential controller. The liquid handling components are site-assembled. Heat transfer fluid is 50% tetra-ethylene solution.

Made in Canada

Manufactured by:
Solar World Heating Systems Corporation
3814 Victoria Park Avenue
Willowdale, Ontario
M2H 3H7
Gary E. MacKinnon
(416) 494-5829

Solatherm Closed Loop

The Solatherm Closed Loop DHW package is a double-pump, double-tank system incorporating Solco liquid flat plate collectors with internal manifolds. System components include Solatherm 270S pre-heat storage tank, Alfa Laval CB25 heat exchanger, Taco pumps and a Solatherm S12-2E controller. The liquid handling unit is pre-assembled and mounted on top of the pre-heat tank which is installed in series with a conventional DHW tank for back-up heat. Heat transfer fluid is Dowfrost NT.

Made in Canada

Solar Product Data Sheet 27

Manufactured by:
Solatherm Inc.
2600 Drew Road
Mississauga, Ontario
L4T 3M5
(416) 677-1020

Solatherm Drain Back

The Solatherm DHW package is a single-pump, double-tank pressurized drain back system incorporating Solco liquid flat plate collectors with internal manifolds. The system includes a Solatherm 270S pre-heat storage tank with an attached liquid handling unit consisting of Richdel R798 pump, Solatherm S12-DB2 controller, and an air compressor. City water at supply pressure is circulated through the collectors and drains back to the tank when the pump is turned off. A conventional DHW tank is required for back-up heat.

Made in Canada

Solar Product Data Sheet 24

Manufactured by:

Solatherm Inc.

2600 Drew Road
Mississauga, Ontario
L4T 3M5

(416) 677-1020

Solcan TS 40-40

Solcan's TS 40-40 is a thermosyphon DHW package consisting of two Solcan 2003 collectors and a 180-litre storage tank. The system relies on natural convection and is appropriate for non-freezing conditions, such as during the summer months in Canada or year-around in warmer climates.

Made in Canada

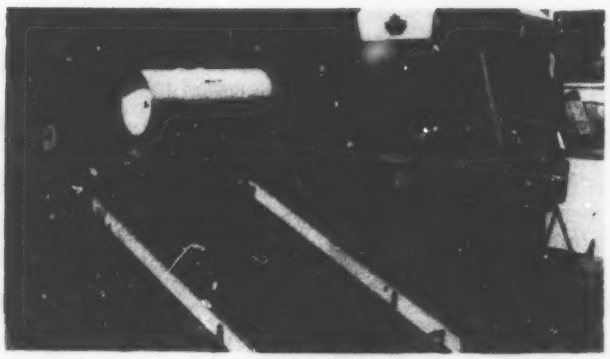
Manufactured by:

Solcan Ltd.

R.R. 3
London, Ontario
N6A 4B7

R.K. Swartman
(519) 473-0501

Solar Product Data Sheet 42



Solcan Closed Loop

The Solcan DHW package is a single-pump, single-tank, closed loop system incorporating Solcan 2003 liquid flat plate collectors with external headers. System components include a Ford Solar Water Heater with integral heat exchanger, Grundfos three-speed UPS 20-42 pump and a Conserval 105 differential thermostat. The storage tank can be fitted with an optional auxiliary electrical heating element for a single-tank system or installed without an auxiliary heater in series with a conventional DHW tank as a two-tank system. Liquid handling components are site-assembled. Heat transfer fluid is Dowfrost food grade propylene glycol.

Made in Canada

Solar Product Data Sheet 23

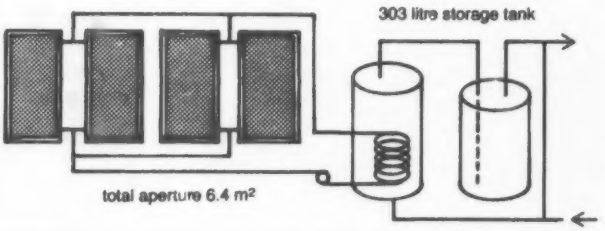
Manufactured by:

Solcan Ltd.

R.R. 3
London, Ontario
N6A 4B7

R.K. Swartman
(519) 473-0501

Model CL80-80



Sol-Way Drain Back

The Sol-Way DHW package is a single-pump, double-tank, drain back system incorporating Sol-Way liquid flat plate collectors with external manifolds. System components include Sol-Way SST-35 interior heat exchange tank, Sol-Way PET-100 exterior storage tank, a Little Giant pump and Delta T DTT-90 differential controller. A conventional DHW tank is required for back-up heat. Heat transfer fluid is tap water. A thermosyphon system is also offered.

Made in Canada

Solar Product Data Sheet 29

Manufactured by:

Sol-Way Solar Engineering Ltd.

Suite 30
942 S.W. Marine Drive
Vancouver, British Columbia
V6M 1B5

J.L. Richardson
(604) 324-3327

Sun Ray Closed Loop

The Sun Ray DHW package is a single-pump, double-tank closed loop system incorporating Sun Ray 37 liquid flat plate collectors with internal manifolds. System components include Ford solar storage tank with integral heat exchanger, Taco 008V pump and Independent Energy C-30 differential controller. A conventional DHW tank is required for back-up heat. Liquid handling components are pre-assembled in a module for mounting beside the tank. Heat transfer fluid is Dowfrost NT.

Made in Canada

Solar Product Data Sheet 20

Manufactured by:

Sun Ray Solar Systems Ltd.

2429 Seminole Street
Windsor, Ontario
N8Y 1X2

(519) 253-1182

Temspec LSC-200 Closed Loop

The Temspec LSC-200 DHW package is a single-pump, double-tank closed loop system incorporating Sunrich L-200 liquid flat plate collectors with external manifolds. System components are a Solarstream tank with wrap-around exterior heat exchanger, a Grundfos UPS 20-42 two-speed pump and a Rho Sigma RS-500 differential controller. The liquid handling and control package is pre-assembled. Recommended heat transfer fluid is Dowfrost NT or Dowtherm SR-1.

Made in Canada

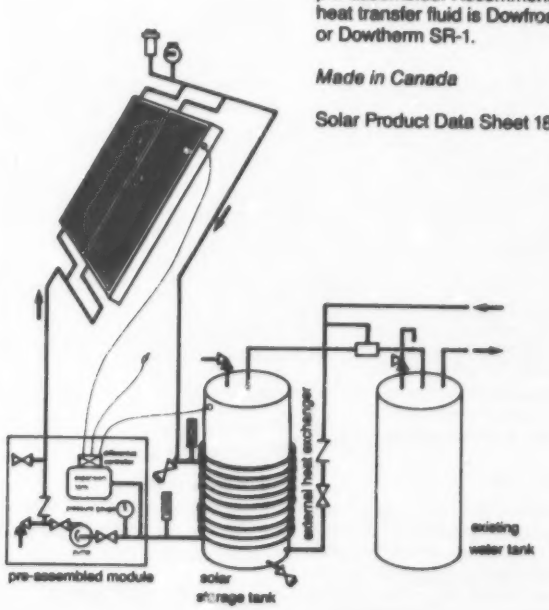
Solar Product Data Sheet 18

Manufactured by:

Temperature Specialties Mfg. Ltd.

585 Canarctic Drive
Downsview, Ontario
M3J 2P9

T.A. Lucas
(416) 661-0535



Watershed Drain Back

The Watershed DHW package is a single-pump, tank-in-tank drain back system incorporating Watershed L-100A liquid flat plate collectors with internal headers. System components include Independent Energy differential controller and a Grundfos pump. The liquid handling components are site-assembled.

Made in Canada

Manufactured by:

Watershed Energy Systems Ltd.

97 Six Point Road
Etobicoke, Ontario
M8Z 2X3

Bruce Morton
(416) 233-3241

1.3 Swimming Pool Heating Systems

Bio-Energy

The Bio-Energy pool system consists of factory pre-assembled SolaRoll collectors, four feet wide and 20, 30 or 40 feet long, and a Delta-T differential controller. Installation instructions are provided, but locally available valves and plumbing are not included.

Made in USA

Manufactured by:

Bio-Energy Systems Inc.

221 Canal Street
Ellenville, NY
USA

Russel Taub
(914) 647-6700

Distributed by:

Kerr Solar Systems

R.R. 1
Chatham, Ontario
N7M 5J1

Wilson Kerr
(519) 354-4127

Tri Energy Tech Inc.

1540-D Highway 97 S.
Kelowna, British Columbia
V1Z 1A8

Ken Farrish
(604) 769-3060

Fafco

The Fafco pool system consists of Fafco plastic unglazed pool collectors, an adjustable differential controller with two sensors, and two valves. A manual version, without the controller, is also available.

Made in USA

Manufactured by:

Fafco Inc.

235 Constitution Drive
Menlo Park, CA
USA 94025

Distributed by:

Envirotron Solar

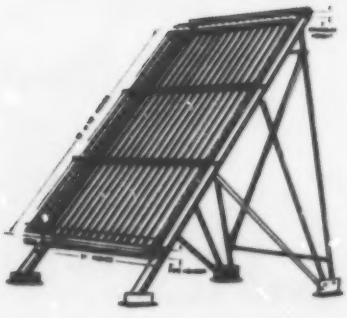
2600 Drew Road
Mississauga, Ontario
L4T 3M5

(416) 677-1020

Bydand Solar Centre

P.O. Box 33744, Station D
Vancouver, British Columbia
V6J 4L6

(604) 731-4171



SP 2000

The Amherst pool system consists of Amherst SP 2000 glazed thermo-formed plastic collectors, with mounting attachments and couplings, solenoid valve, differential controller and sensors, check valve, vacuum relief valve and optional balancing valve.

Made in Canada

Manufactured by:

Amherst Renewable Energies Ltd.

1070 Morrison Drive
Ottawa, Ontario
K2H 8K7

(613) 820-3274

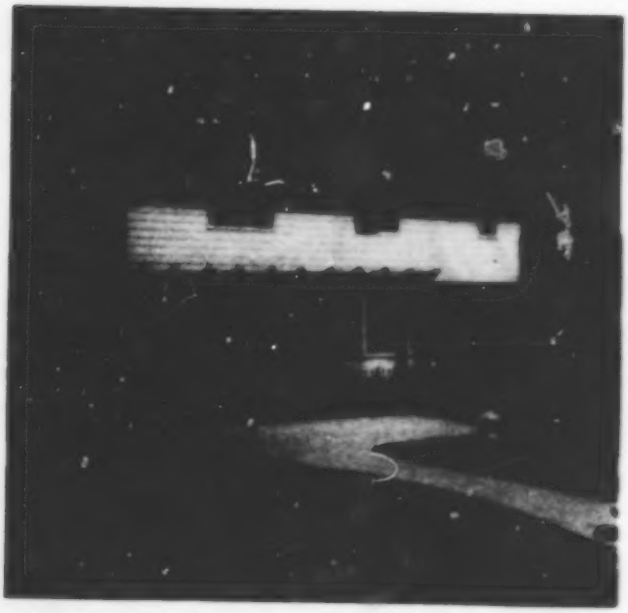
Solarplast

The Thermo Solar/Solarplast pool heating package consists of Thermo Solar/Solarplast unglazed extruded co-polymer plastic collectors and a pre-assembled control module, which includes a check valve, automatic ball valve, flow control valve with removable handle, differential controller and sensors.

Made in Canada

Manufactured by:
Solarplast Ltd.
1045 Hargrieve Road
London, Ontario
N6E 1P6

David Ritchie
(519) 685-1480



Solar Industries

Solar Industries' solar pool heating system consists of Aqua-Thermal collectors and a three-way motor-driven valve. Accessory modules accommodate booster pumps, pool cleaners, and two-speed pumps.

Made in USA

Manufactured by:
Solar Industries Int'l.
2300 Highway 34
Manasquan, NJ
USA 08736

Marcel A. Bally
(201) 223-9100

Distributed by:
Bruce Benson Ltd.
1810 Bank Street
Ottawa, Ontario
K1V 7Y6

(613) 733-0332

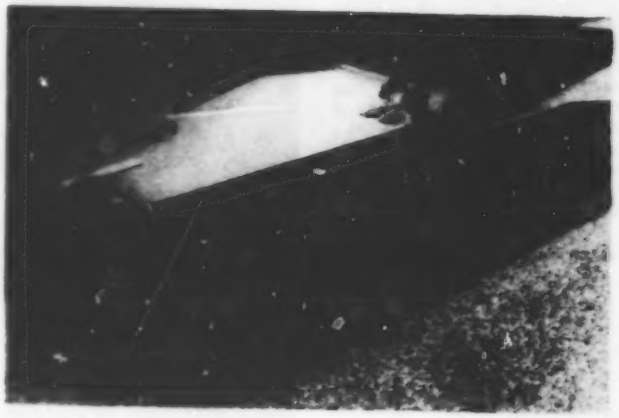
SOL-500

Manufactured by:
Solarsystems Industries Ltd.
2-11771 Horseshoe Way
Richmond, British Columbia
V7A 4S5

Blair D. Salter
(604) 271-2621

The Solarsystems pool heating system incorporates unglazed SOL-500 collectors. The system components include electric valves, one normally open and one normally closed and the SOL-900 differential controller. Options include flashing for improved appearance and to prevent wind from blowing under panels, and a rack for mounting collectors on the ground.

Made in Canada



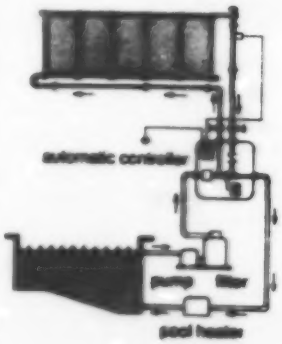
Sunglo

Manufactured by:
Sunglo Solar Ltd.
1081 Alness Street
Downsview, Ontario
M3J 2J1

Joe Sherman
(416) 661-2560

The Sunglo pool heating package consists of the Sunglo unglazed extruded co-polymer plastic collectors, mounting edge strips, vacuum relief valve and a pre-assembled control module. The control module includes a differential controller, sensors, check valve, flow control valve, and an automatic balancing valve. A manual version is also available.

Made in Canada



1.4 Solar Greenhouses

Advanced Greenhouses

AGL solar conservatories and greenhouses are specifically designed to be energy-efficient. Glazing is Tuffak Twinwall, a double-wall light-diffusing polycarbonate; clear polycarbonate panels are optional. Thermal storage systems, thermal curtains, and shade cloth are available. The frame-work is aluminum and includes a manually operated ventilator. A variety of options are offered, such as an insulated splash wall, a thermostatically operated ventilator, a glazed entrance door, and an electronic heating and ventilating control system. The greenhouses come as complete kits with instructions and hardware. AGL can perform installations within 100 km of Waterloo, Ontario.

Made in Canada

Manufactured by:
Advanced Greenhouses Ltd.
440 Phillip Street
Waterloo, Ontario
N2L 5R9

Andris Balodis
(519) 885-1170

Four Seasons

Four Season greenhouse/ sunrooms are double-glazed or triple-glazed with tempered glass thermally separated from the bronze baked-enamel-finish tubular aluminum frame. Free-standing and add-on models are offered with straight or curved eaves in various sizes. Thermostatically controlled fans direct solar heated air into the house. Thermol 81 rods are used for thermal storage.

Made in USA

Manufactured by:
Four Seasons Greenhouses
910 Route 110
Farmingdale, NY
USA 11735

Distributed by:
Cliff Slade
34 Cedar Drive
Caledon, Ontario

Cliff Slade
(519) 927-3239

Kerr Solar Greenhouses

Manufactured by:
Kerr Builder
P.R.#3
Dalkeith, Ontario
K0B 1E0

Richard Kerr
(613) 874-2293

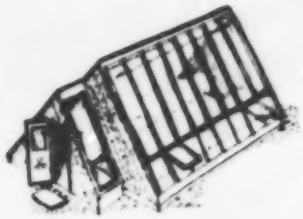
Kerr Solar Greenhouses come in a prefabricated kit constructed with treated pine framing. Roof is glazed with clear acrylic, while the south-wall glazing can be either acrylic or glass. Options include multi-layered aluminized vinyl night curtains, an under-soil heating system, and a fan to transfer heat to the house. Cedar framing, aluminum framing, and tempered-glass units are also available. Custom-built models can be ordered.

Made in Canada

Solplan 3

Published by:
The Drawing-Room Graphic Services Ltd.
P.O. Box 86827
North Vancouver, British Columbia
V7L 4L2

(604) 689-1841



A how-to-do-it-yourself book with separate chapters on solar greenhouse basics, building your greenhouse, and growing plants in a solar greenhouse. Many illustrations, including seven free-standing solar greenhouse designs and worksheets for energy calculations. 60 pages. $4.50. Similar publications include "Solplan 5", which deals with energy conserving passive solar houses for Canada.

Made in Canada

Solarium Sun Room

Manufactured by:
Lord and Burnham Co. Ltd.
325 Welland Avenue
St. Catharines, Ontario
L2R 6V9

Geoff Francis
(416) 586-6573

The Solarium is a glass sun room intended for family living and limited solar collection. It features tinted double-glazed glass on hollow aluminum frames with curved eaves, and a sliding glass door. Roof glass is tempered.

Made in Canada

Solar Greenhouse Plans

Plans are available for attached solar greenhouses that can be added onto existing houses or incorporated into new construction. The greenhouses are 3 metres deep and can be built in lengths from 3.6 metres to 7.3 metres. The design features galvanized steel water-filled columns for thermal storage and overhead reflector/insulating shutters. Plans include an owner's guide.

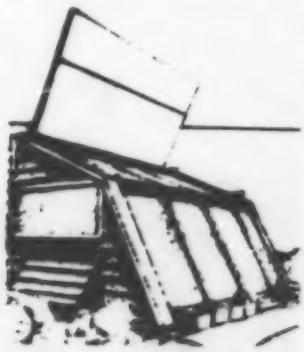
Made in Canada

Available from:

Solar Applications & Research Ltd.

3683 West 4th Avenue
Vancouver, British Columbia
V6R IP2

Chris Mallock
(604) 733-5831



Solarium

Solarium manufactures a line of greenhouses with tempered double-glazing throughout. Framework is thermally-broken anodized aluminum in white or brown. An automatic ventilation system transfers heat to the house. Custom models can be ordered.

Made in Canada

Manufactured by:

Solarium Serres Ltée

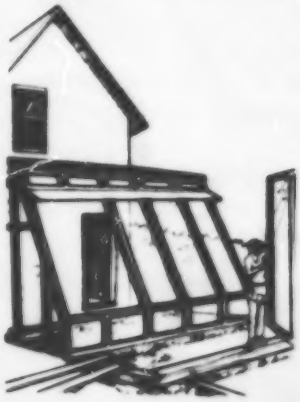
882, Roger
Granby, Québec
J2G 1A8

Solarium Primer and Workbook

Published by:

National Research Council

Solar Energy Project
Montreal Road
Ottawa, Ontario
K1A 0R6



"The Solarium Primer" presents an introduction to the basic concepts of an energy-efficient solarium, with some information on siting, design, and construction. Add-on greenhouses and the conversion of balconies and carports are discussed. Horticultural uses are not dealt with.

"The Solarium Workbook" reviews the same material and then provides detailed design information and calculation worksheets for energy performance, operating and construction costs, and a life-cycle cost analysis.

Made in Canada

Serbri Winter Gardens

Manufactured by:

Serbri Ltée

2138, Route 220
St. Elie d'Orford, Québec

(819) 565-1037

Serbri Winter Gardens are double-glazed with Lexan polycarbonate in a baked enamel aluminum frame. Free-standing and lean-to models are offered in four different widths each, and in lengths to 9 metres.

Made in Canada

Solterra Greenhouses

Solterra's attached solar greenhouse is 2.4 metres wide and 3.6 metres long, with optional lengths in multiples of 1.2 metres. All framing members are Western red cedar, with posts set in concrete below the frost line. Double-glazing is acrylic or polycarbonate for the roof and glass for the vertical south face. End and knee walls are insulated. Thermal storage is provided by a patio stone floor set over foam insulation. Custom designs for solar greenhouses, sunspaces, and double-stud houses are also available.

Made in Canada

Manufactured by:
Solterra Developments Ltd.

1355 Wellington Street
Ottawa, Ontario
K1Y 3C2

Michael Lambert
(613) 729-3116

Sunpiace

Sunpiace Solar Greenhouses are either 2 or 3 metres wide and from 3.6 to 7.3 metres long in multiples of 1.2 metres. Height is 2.9 metres. The structural frame is extruded aluminum with a baked enamel finish. Curved eave glazing is double-skinned acrylic; 60-degree sloped double-glazing is tempered factory-seated glass. Roof, south knee-wall, and portions of end walls are insulated with aluminum-covered foam panels. Thermal storage tubes hang from the ceiling. A differential controller with remote sensors controls operation of a distribution fan. Polyester-mylar thermal shades roll down to cover glazing.

Made in USA

Manufactured by:
Sunpiace Corp.

Box 237
Hinesburg, VT
USA 05461

(802) 658-3524

Distributed by:
The Sunwrights

483 McLaren Street
Ottawa, Ontario
K1R 5K5

Jonathan Cloud
(613) 234-2427

Solcan Greenhouses

Manufactured by:
Solcan Ltd.

RR 3
London, Ontario
N6A 4B7

R. Swartman
(519) 473-0501

One lean-to and two different free-standing models are available in kit form or they can be installed by Solcan. Basic size is approximately 2.4 metres by 2.4 metres; larger sizes are available on custom order. Construction is wood frame with insulated back walls, knee walls, and end walls, with an aluminum skin. Glazing is double-wall polycarbonate.

Made in Canada

2. Components

2.1 Glazed Liquid Flat Plate Collectors

Atlantic Solar Products

The Atlantic Solar Products liquid flat plate collector is double-glazed with Quatex polycarbonate. The absorber is aluminum with copper risers bonded to the plate with heat transfer cement. The collector container is fibreglass plastic and the insulation is degassed fibreglass.

Made in Canada

Manufactured by:
Atlantic Solar Products Ltd.

P.O. Box 195
Guysborough, Nova Scotia
B0H 1G0

Mark Haynes
(902) 533-2835

Fibratech

Production will begin in 1982 on Fibratech's new liquid flat plate collector. Glazing is low-iron glass, and the absorber is aluminum Roll-Bond with the option of black chrome or black paint coating. The collector container is aluminum and the insulation is fibreglass. The collector will have a freon charge, and will contain a built-in heat exchanger.

Made in Canada

Manufactured by:
Fibratech Inc.

5350-13 Avenue Rosemont
Montréal, Québec
H1X 2X8

Pierre Boisvert
(514) 727-5955

Lennox SC3-32S

The Lennox SC3-32S liquid flat plate collector is single-glazed with low-iron tempered glass. The fin-and-tube absorber consists of ripple-edged aluminum fins fitted to copper tubes and painted flat black. Insulation is fibreglass and the collector frame and back are galvalume steel with an extruded aluminum cover to protect against corrosion.

Made in USA

Distributed by:
Lennox Industries (Canada) Ltd.

400 Norris Glen Road
Etobicoke, Ontario
M9C 1H5

Rody Parker
(416) 621-9302

Sun Catcher

The Sun Catcher liquid flat plate collector is glazed with low-iron tempered glass and the absorber is aluminum with copper flex tubes attached. The container is aluminum and the insulation is urethane.

Made in Canada

Manufactured by:
Maple Ridge Solar Ltd.

20120 Patterson Avenue
Maple Ridge, British Columbia
V2X 2P4

Ron Sawchenko
(604) 465-8511

Nortec TD 1000

Nortec's TD 1000 thermal diode collector is single-glazed with low-iron tempered glass, and consists of spectrally selective black chrome coating on a copper thermal diode absorber. The absorber system consists of a vertical grid of 8 vapour-generating tubes sealed with a non-toxic chemically inert fluid. These tubes are connected to a chamber at the top through which a copper heat exchanger tube passes. Solar energy causes the sealed fluid to boil and transfer the heat to the system fluid circulating through the tube in the upper chamber. Absorber and glass are mounted in an aluminum frame insulated with high-temperature fibreglass.

Made in Canada

Solar Product Data Sheet 26

Manufactured by:
Nortec Solar Industries Inc.

P.O. Box 760
Manotick, Ontario
K0A 2N0

Jim Ramsden
(613) 692-2513

SP 2000

The Amherst SP 2000 liquid flat plate collector is designed for swimming pool and low temperature process hot water heating. The collector, which has no frame or insulation, is made of thermoformed high-temperature plastics. The absorber is Noryl, corrugated to form triangular fluid passages with integral manifolds. The glazing is polycarbonate.

Made in Canada

Solar Product Data Sheet 13

Manufactured by:

Amherst Renewable Energies Ltd.

1070 Morrison Drive
Ottawa, Ontario
K2H 8K7

(613) 820-3274

Slimline CMT

The Slimline CMT liquid flat plate collector is single-glazed with low-iron tempered glass. The absorber is a copper alloy plate with a black chrome surface and copper flow tubes. The container is extruded aluminum with a baked enamel finish. The insulation is polyisocyanurate foam.

Made in USA

Manufactured by:

Solar Industries Int'l

2300 Highway 34
Manasquan, NJ
USA 08736

Distributed by:

Bruce Benson Ltd.

1810 Bank Street
Ottawa, Ontario
K1V 7Y6

Bruce Benson
(613) 733-0332

Thermo Solar STM & CIM-1"

Petro-Sun's Thermo Solar STM and CIM-1" liquid flat plate collectors are single-glazed with low-iron tempered glass. Absorber consists of a copper tube-and-fin grid with a black chrome selective surface. The insulation is a layer of compressed fibreglass and a layer of foil-faced foam. The container is aluminum. The CIM-2" is identical, except that the copper headers are larger, 50mm rather than 25mm as in the STM and CIM-1".

Made in Canada

Solar Product Data Sheet 7

Manufactured by:

Petro-Sun Inc.

Thermo Solar Division
2290 de la Métropole
Longueuil, Québec
J4G 1E6

(514) 670-8043

Venus and Gemini

Manufactured by:

Solarfin Products

14 Victoria Avenue N.
Hamilton, Ontario
L8L 5E1

Richard Higgins
(416) 522-4132

Solar Product Data Sheet 36

The Venus-L collector is for aqueous fluids. It has a copper Roll Bond absorber with a flat black painted surface. Glazing is dome-formed plexiglass, the container is extruded aluminum, and the insulation is fibreglass. The Venus-R collector is similar, but with an aluminum Roll Bond absorber containing a phase-change refrigerant fluid.

The Gemini collector has an arched acrylic glazing and an aluminum-covered plywood container. The flat black painted absorber consists of copper tubes bonded with a thermal adhesive to aluminum fins which are screwed to the plywood. Insulation is Styrofoam. The Gemini is available in kit form consisting of just the metal components for do-it-yourself or educational uses.

Made in Canada

Sundance

Manufactured by:

Solaquair Corp.

111 Merton Street
Suite 201
Toronto, Ontario
M4S 1A8

Frank Sloan
(416) 486-7108

The Sundance liquid flat plate collector is double-glazed with Tedlar, with tempered glass as an option. The absorber is a sheet of flattened brass tubes, high-frequency seam welded at the headers, which presents a fully wetted surface for absorption. The absorber coating is high-temperature flat black paint. Urethane foam is used for insulation and the container is extruded aluminum.

Made in Canada

Sol 100

Manufactured by:

Solarsystems Industries Ltd.

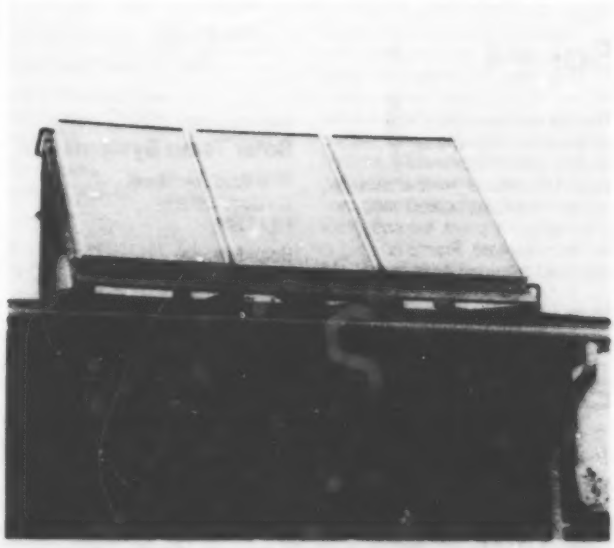
2-11771 Horseshoe Way
Richmond, British Columbia
V7A 4S5

Erich W. Hoffmann
(604) 271-2621

Sol 100 liquid flat plate collectors are single-glazed with low-iron glass. Absorber is copper sheet formed over and continuously soldered to copper riser tubes. Surface is selective black chrome. Back and edge insulation is high-temperature fibreglass. Frame is extruded aluminum and the back is aluminum sheet.

Made in Canada

Solar Product Data Sheet 5



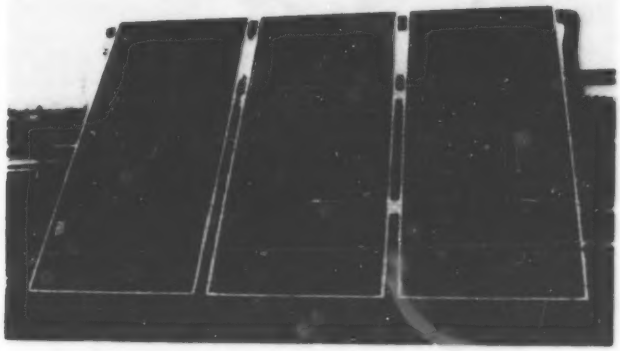
Solartech S37

The Solartech S37 liquid flat plate collector is single-glazed with low-iron glass. The absorber consists of copper tubes ultrasonically bonded to copper fins which are then brazed to copper headers. The selective coating is a black nickel foil adhesively bonded to the absorber. Insulation is a combination of isocyanurate foam and low-binder fibreglass. The collector container is aluminum.

Made in Canada

Solar Product Data Sheet 35

Manufactured by:
Solartech Ltd.
39 Cranfield Road
Toronto, Ontario
M4B 3H6
(416) 752-4990



Sol #4

The Sol #4 liquid flat plate collector is single-glazed or double-glazed with low-iron tempered glass. Absorber plate is copper Roll Bond coated with black selective paint. Insulation is polyisocyanurate. Frame is anodized extruded aluminum.

Made in Canada

Manufactured by:
Solar Temp Systems Ltd.
1110 Brydges Street
London, Ontario
N5W 2B6
Brian Maguire
(519) 451-2962

Econo-Solar

The Econo-Solar liquid flat plate collector is being re-designed for low-iron glass. The black painted absorber consists of copper tubes fastened to aluminum plates. Insulation is fibreglass. Container is enamelled steel.

Made in Canada

Manufactured by:
Solar World Heating Systems Corp.
3814 Victoria Park Avenue
Willowdale, Ontario
M2H 3H7
G. E. MacKinnon
(416) 494-5829

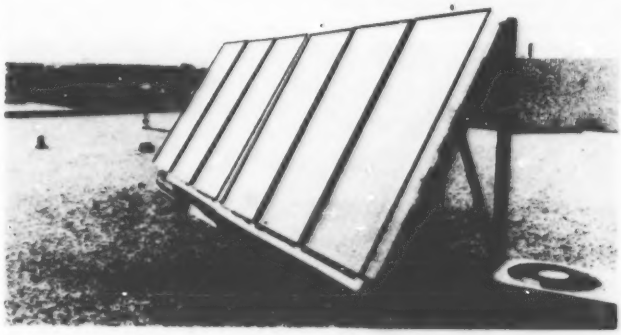
Solco Model 5E

The Solco 5E liquid flat plate collector is single glazed with low-iron tempered glass. The absorber consists of parallel copper tubes continuously soldered to roll-formed copper strips. The selective surface is electroplated black chrome. Insulation is high-temperature fibreglass covered with aluminum foil. Collector container is extruded aluminum.

Made in Canada

Solar Product Data Sheet 3

Manufactured by:
Solatherm Inc.
2600 Drew Road
Mississauga, Ontario
L4T 3M5
(416) 677-1020



Solcan 2005

The Solcan 2005 collector is single-glazed with low-iron glass. The aluminum absorber plate has a serpentine copper tube bonded to it and is coated with a flat black paint. Insulation is polyisocyanurate foam. The collector container is fabricated from aluminum sheet.

Made in Canada

Solar Product Data Sheet 14

Manufactured by:
Solcan Ltd.
R.R. 3
London, Ontario
N6A 4B7
R.K. Swartman
(519) 473-0501

Solestial SSP-201

Solestial's SSP-201D liquid flat plate collector is double-glazed with fibreglass plastic, and the absorber consists of black painted copper fins continuously soldered to copper tubes. The insulation is foil-faced isocyanurate foam. The collector container is extruded aluminum.

Made in Canada

Manufactured by:

Solestial Solar Panels Inc.

44 Bartlett Road, Box 359
Beamsville, Ontario
L0R 1B0

Louis Morissette
(416) 563-8203

Sol-Way SAP

The Sol-Way SAP liquid flat plate collector is single-glazed with flat acrylic, and the absorber consists of black painted aluminum fins moulded to copper tubes. Internal copper headers are sloped for drainage. Container consists of a pre-painted galvanized steel frame to hold the glazing and fibreglass insulation, and to provide the weather-seal. Collectors are designed for drain back operation.

Made in Canada

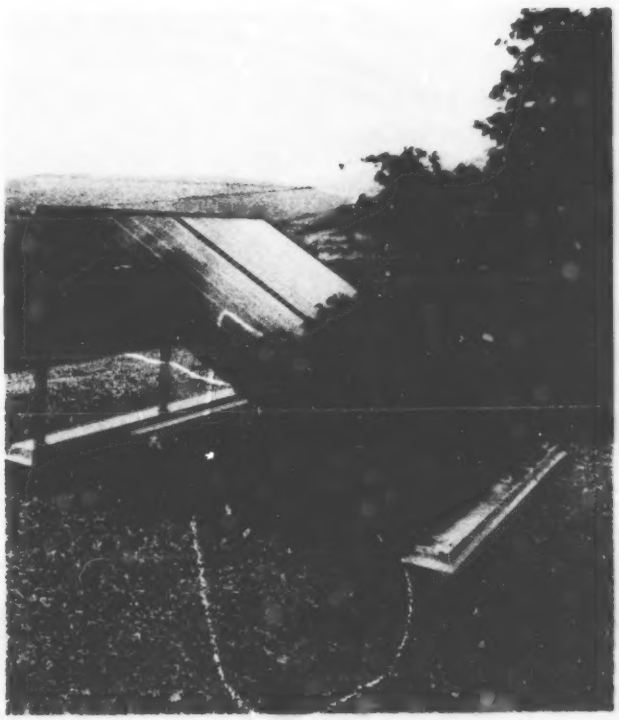
Solar Product Data Sheet 30

Manufactured by:

Sol-Way Solar Engineering Ltd.

942 SW Marine Drive, Suite 30
Vancouver, British Columbia
V6P 5Z2

John Richardson
(604) 324-3327



Sun Ray 37 Series

Manufactured by:

Sun Ray Solar Systems Ltd.

2429 Seminole Street
Windsor, Ontario
N8Y 1X2

E.J. Pattison
(519) 253-1182

The Sun Ray liquid flat plate collector is glazed with low-iron tempered glass. The absorber consists of parallel copper tubes continuously soldered to a die-formed copper sheet with copper headers brazed to the tubes on both ends. The absorber coating is either a high-absorptivity black paint or electro-plated black chrome. Insulation is polyisocyanurate foam and the container is anodized extruded aluminum with an aluminum backing sheet.

Made in Canada

Solar Product Data Sheet 11

Sunrich L-200

Manufactured by:

Temperature Specialties Manufacturers Ltd.

585 Canarctic Drive
Downsview, Ontario
M3J 2P9

Tibor Lucas
(416) 661-0525

The Temspec Sunrich liquid flat plate collector is single-glazed with pebbled finish, low-iron glass. The absorber consists of copper tubes continuously soldered to a copper sheet and is coated with a selective black chrome. The container is galvanized steel; degassed fibreglass is used as the insulation.

Made in Canada

Solar Product Data Sheet 15

Watershed L-100A

The Watershed L-100A is a single-glazed liquid flat plate collector, with a finned tube absorber plate, suitable for drain down, drain back or antifreeze systems. Aluminum absorber fins are coated with a selective surface and are mechanically bonded to copper risers. Header manifolds are within the extruded aluminum collector container.

Made in Canada

Solar Product Data Sheet 33

Manufactured by:

Watershed Energy Systems Ltd.

97 Six Point Road
Etobicoke, Ontario
M8Z 2X3

Bruce Morton
(416) 233-3241

2.2 Unglazed Liquid Flat Plate Collectors

SolaRoll

SolaRoll is a site-assembled collector consisting of a flexible synthetic rubber mat made of EPDM fastened to the roofing with a thermo-setting mastic. No mechanical fasteners are required. The mat is available in lengths up to 183 metres. ABS manifolds are used in unglazed installations, but copper manifolds are required for glazed installations. Framing strips are available to serve as flashing and to allow standard lumber and glazing to be used. Factory-built collector modules are also available.

Made in USA

Manufactured by:

Bio-Energy Systems Inc.

Box 87
Ellenville, NY
USA 12428

Distributed by:

Kerr Solar Systems

R.R. 1
Chatham, Ontario
N7M 5J1

Wilson Kerr
(519) 354-4127

Tri Energy Tech Inc.

1540-D Highway 97 S.
Kelowna, British Columbia
V1Z 1A8

Ken Farrish
(604) 769-3080

Fafco

Fafco collectors are made from a black polypropylene with ABS headers. The absorber consists of a number of parallel circular channels. A fibreglass-reinforced glazing is optionally available. Two sizes are available.

Made in USA

Manufactured by:

Fafco Inc.

235 Constitution Drive
Menlo Park, CA
USA 94025

Distributed by:

Envirotron Solar

2600 Drew Road
Mississauga, Ontario
L4T 3M5

(416) 677-1020

Bydand Solar Centre

204 - 8475 Ontario Street
Vancouver, British Columbia
V5X 3E8

(604) 731-4171

Solarplast

Manufactured by:

Solarplast Ltd.

1045 Hargrieve Road
London, Ontario
N6E 1P6

David Ritchie
(519) 685-1480

Thermo Solar/Solarplast low temperature collectors are made of food-grade copolymer plastic. The unglazed plastic absorber is connected to top and bottom headers of the same material, using a heat-sealing process. Collectors are connected with rubber couplers. A glazed version is also available.

Made in Canada

Solar Product Data Sheet 34

Aqua-Therm

The Aqua-Therm collector consists of a polypropylene absorber plate with integral headers and comes with hold-down channel of black enamelled aluminum. Model is available with an ultraviolet-resistant coated polycarbonate glazing.

Made in USA

Manufactured by:
Solar Industries
2300 Highway 34
Manasquan, NJ
USA 08736

Distributed by:
Bruce Benson Ltd.
1810 Bank St.
Ottawa, Ontario
K1V 7Y6

Bruce Benson
(613) 733-0332

SOL 500

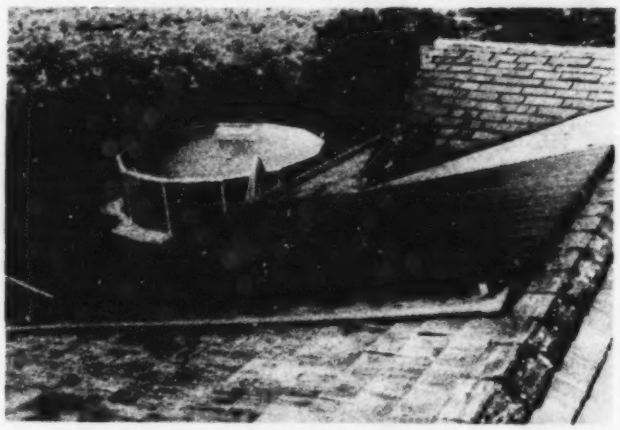
SOL 500 is an unglazed all-metal flat plate collector designed for swimming pool and other low-temperature water heating applications. Absorber consists of extruded aluminum pressed over copper headers. There is no container or insulation. Absorber panel is available in four lengths and three colors. Optional side trim, painted black to match the absorber, improves efficiency by preventing wind from blowing under the absorber panel.

Made in Canada

Solar Product Data Sheet 32

Manufactured by:
Solarsystems Industries Ltd.
#2-11771 Horseshoe Way
Richmond, B.C.
V7A 4S5

Erich Hoffmann
(604) 271-2621



Sunglo

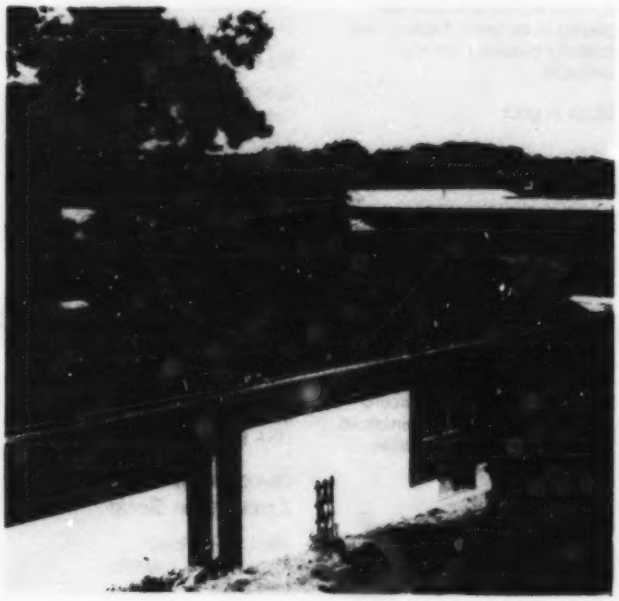
Manufactured by:
Sunglo Solar Ltd.
1081 Alness Street
Downsview, Ontario
M3J 2J1

Joe Sherman
(416) 661-2560

The Sunglo liquid collector is unglazed and is intended for swimming pool heating. The panel consists of a plastic absorber with top and bottom headers. There is no glazing or insulation. End fittings and mounting hardware are included. Edge mounting strips are fitted between adjacent panels and the complete installation has the appearance of a solid black surface.

Made in Canada

Solar Product Data Sheet 16



2.3 Air Flat Plate Collectors

Amherst 200

The Amherst 200 air flat plate collector is double-glazed with Tedlar on the outside and Teflon on the inside. The absorber is a fibreglass matrix-type coated with flat black paint. The frame is galvanized steel and the collector is insulated with high temperature fibreglass.

Made in Canada

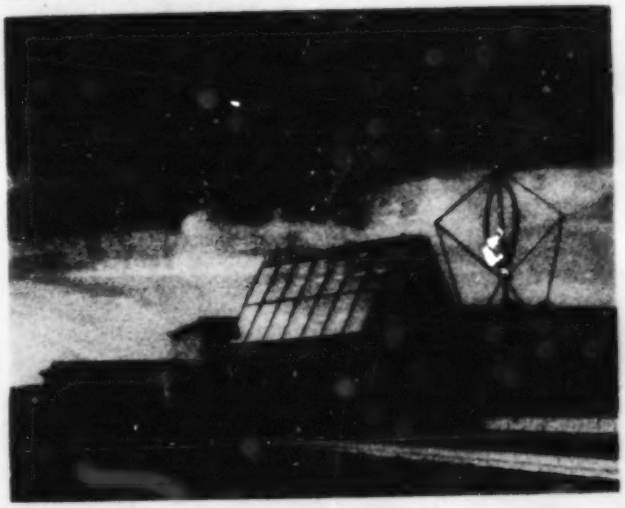
Solar Product Data Sheet 8

Manufactured by:

Amherst Renewable Energies Ltd.

1070 Morrison Drive
Ottawa, Ontario
K2H 8K7

(613) 820-3274



Air Collector Construction Manual

Conserval Engineering offers a 50-page manual for those who wish to build their own air collectors on site. The manual contains diagrams, drawings, and photographs. Materials can be bought locally; Conserval can supply a corrugated aluminum absorber, tempered glass or Teflon glazing, an air handler, and a controller.

Made in Canada

Available from:

Conserval Engineering Inc.

855 Alness Street, Suite 1
Downsview, Ontario
M3J 2H8

John Hollick
(416) 661-7057

Solair

The Solair air flat plate collector has a curved cover plate of Lexan polycarbonate sheet. The absorber is steel with a black chrome selective coating and is positioned between the frame walls and internal baffles to create a lens-shaped air duct. The frame walls are mill-finished aluminum extrusions and the internal insulation is foamboard.

Made in Canada

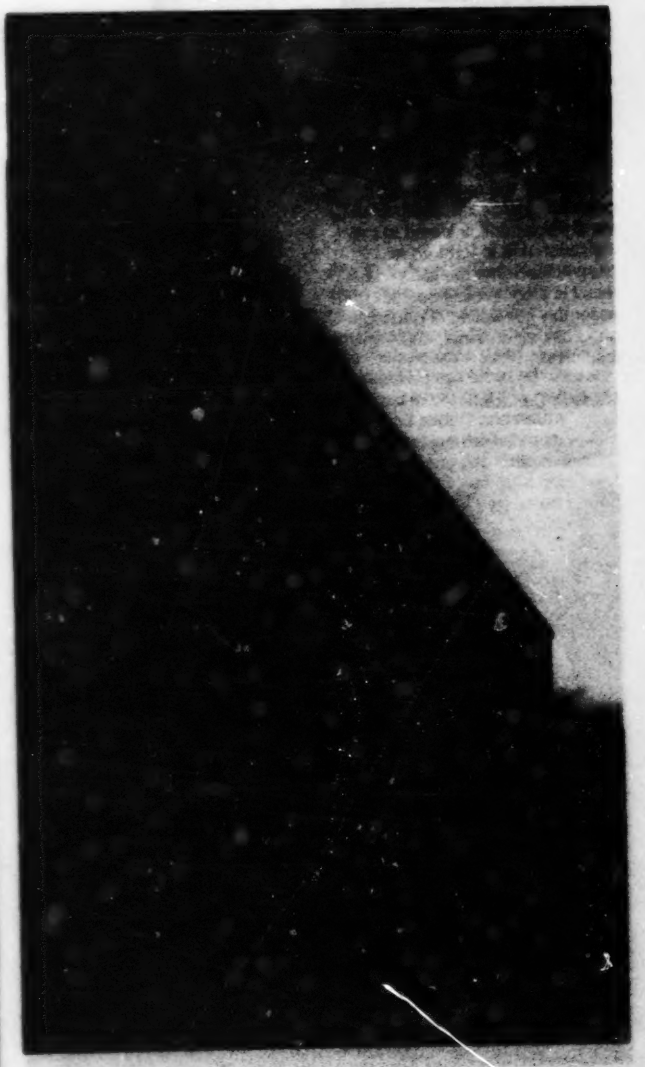
Solar Product Data Sheet 4

Manufactured by:

Solartech Ltd.

39 Cranfield Road
Toronto, Ontario
M4B 3H6

(416) 752-4990



Econo-Air

The Econo-Air collector features curved fibreglass glazing separated from the absorber by a wooden divider. The metal container is insulated.

Made in Canada

Manufactured by:
Solar World Heating Systems Corp.
3814 Victoria Park Avenue
Willowdale, Ontario
M2H 3H7

Garry MacKinnon
(416) 494-5829

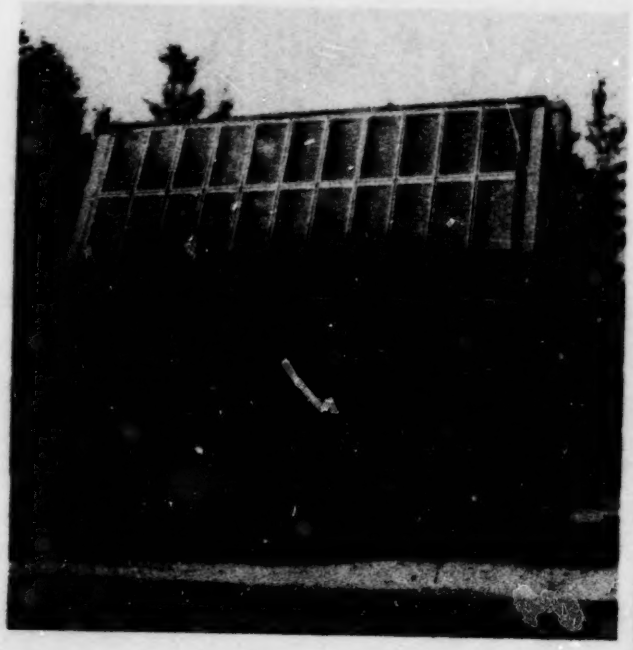
Watershed A-100

Watershed's A-100 series air collectors consist of two separate modules. The collector unit features tempered low-iron glass and a steel or aluminum absorber with a selective coating, mounted in an aluminum frame. The collector unit can be mounted directly on a roof so that an air channel is provided between the absorber and the roofing; insulation must be provided underneath the roof surface. If the collector is to be rack-mounted, the collector unit is joined to the insulation unit to form an air channel between the two. The result is a completely sealed assembly consisting of glazing, absorber, air channel, and insulation.

Made in Canada

Manufactured by:
Watershed Energy Systems Ltd.
97 Six Point Road
Etobicoke, Ontario
M8Z 2X3

Bruce Morton
(416) 233-3241



Honeycomb A-150

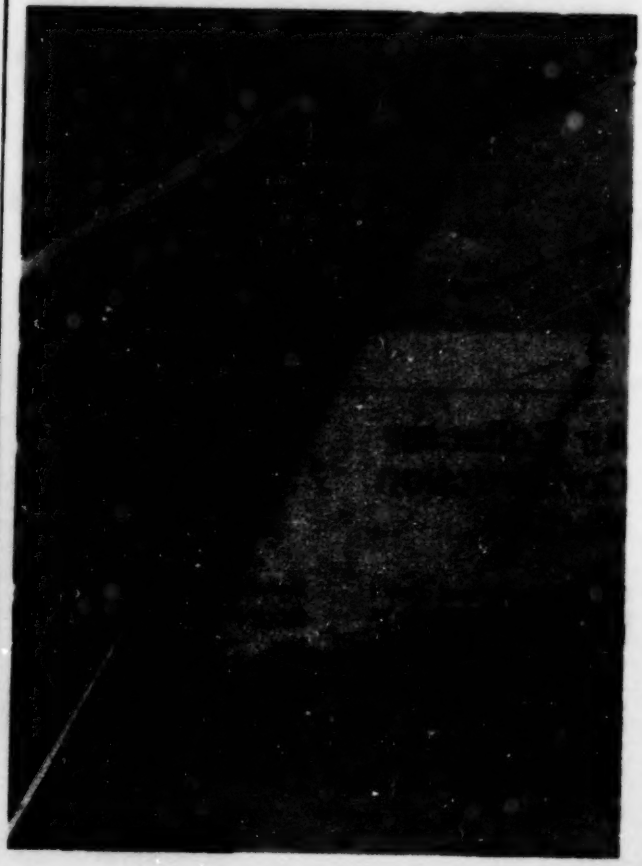
Manufactured by:
Watershed Energy Systems Ltd.
97 Six Point Road
Etobicoke, Ontario
M8Z 2X3

Bruce Morton
(416) 233-3241

The Watershed Honeycomb air flat plate collector consists of a collector unit and an insulation unit. The collector unit has low-iron glass set into an extruded aluminum frame. The absorber is sheet steel with black nickel or black chrome selective surface. A transparent slit-type Teflon honeycomb is located between the glazing and absorber. The collector unit can be mounted directly on a prepared roof surface or in combination with the insulating unit. In both cases the air passes behind the absorber plate. The insulation unit contains fibreglass insulation in a moulded fibreglass-reinforced polyester casing. When the collector and insulation units are joined together, an enclosed air channel is formed.

Made in Canada

Solar Product Data Sheet 2



2.4 Concentrating and Tracking Collectors

Petro-Sun

The Petro-Sun Concentrating Collector is composed of individual mirror elements. The mirrors follow the sun continuously and are controlled by a photovoltaic drive mechanism. The tubular absorber is an elevated tube which is located above the mirror surface.

Made in Canada

Manufactured by:
Petro-Sun Inc.

Thermo Solar Division
2290 de la Métropole
Longueuil, Québec
J4G 1E6

(514) 670-8043

Mercury

Manufactured by:
Solarfin Products

14 Victoria Avenue N.
Hamilton, Ontario
L8L 5E1

Richard Higgins
(416) 522-4132

The Mercury Concentrating Collector is a right-angled isosceles triangle two metres long with an aluminun reflector on one inner face, copper tube and aluminum fin absorber on the other inner face at right angles to the former. The absorber and the collector are painted black. The collector is single-glazed with Tedlar.

Made in Canada

2.5 Evacuated Tube Collectors

Amherst A-300

The Amherst A-300 collector is a module consisting of ten Philips evacuated tube heat pipes which are made in Holland. They consist of a selectively coated absorber sealed inside a glass tube about one metre long and 70mm in diameter. The tubes are connected via heat exchangers to a header pipe. A back reflector directs solar rays onto the absorbers.

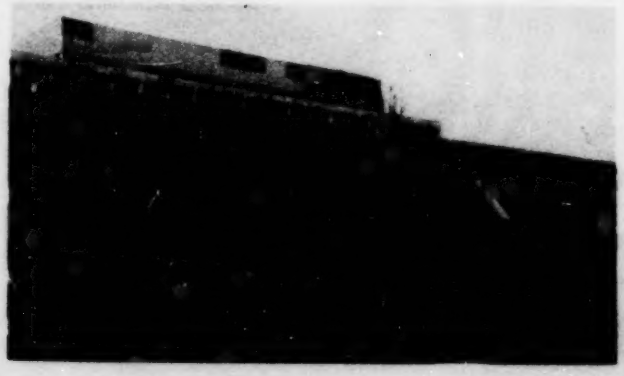
Made in Canada

Manufactured by:
Amherst Renewable Energies Ltd.

1070 Morrison Drive
Ottawa, Ontario
K2H 8K7

(613) 820-3274

Solar Product Data Sheet 38



Solartech ETC

Manufactured by:
Solartech Ltd.

39 Cranfield Road
Toronto, Ontario
M4B 3H6

(416) 752-4990

The Solartech ETC module is a drain down, liquid collector capable of delivering fluid temperatures up to 115°C (240°F). The module consists of eight evacuated glass tubes which are arranged in parallel flow, with a one-sided supply and return header. Behind the tubes is located a parabolic cusp reflector which concentrates light onto the glass tubes. The evacuated tubes are manufactured by Owens-Illinois.

Made in Canada

Solar Product Data Sheet 12

2.6 Storage Tanks

Conservationist

The Conservationist is a glass-lined tank with two magnesium anodes, a brass drain valve, and two replaceable double-wall copper heat exchangers; two additional heat exchangers are optional. These tanks are covered with 76mm of fibreglass insulation inside an enamel-finished galvanized steel jacket. A back-up electric heating element and attached pump and controller packages are available. The tank comes in 310, 378, and 450 litre capacities.

Made in USA

Available from:

A.O. Smith Corp.

Box 310
Stratford, Ontario
N5A 6T3

George Pick
(519) 271-5800

Petro-Sun Tank

The Petro-Sun drain back tank is made of high-temperature epoxy/fibreglass with an internal heat exchanger. The tank is insulated with fibreglass and covered with a galvanized steel jacket. 19mm inlet and outlet connections are located on the top. Solar loop connections are 32mm, one on the top and the other on the side.

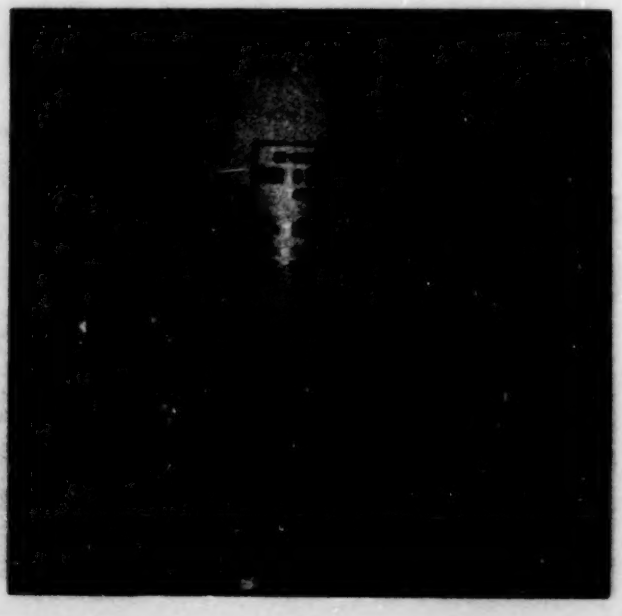
Made in Canada

Available from:

Petro-Sun Inc.

2290 de la Métropole
Longueuil, Québec
J4G 1E6

(514) 670-8043



Ford

Manufactured by:

Ford Products Corp.

Ford Products Road
Valley Cottage, NY
USA 10989

(914) 358-8282

Distributed by:

Contact Ford Products for local Canadian distributor

Ford solar storage tanks are stone-lined and contain a finned single-wall copper-coil heat exchanger. Double-wall heat exchangers with leak detection to atmosphere are available. Tanks are fibreglass-insulated and baked enamel-jacketed. Four sizes are offered: 151, 246, 303 and 454 litres. Back-up electric heating elements are optional for all but the smallest size with or without a separate thermostat with a high cut-off limit.

Made in USA

JW1200S

Manufactured by:

John Wood Ltd.

101 Hanson Street
Toronto, Ontario
M4C 1A2

George McNeill
(416) 698-9100

The John Wood JW1200S storage tank is a glass-lined insulated steel tank covered with an enamel-coated jacket. The tank contains a sacrificial magnesium anode rod for corrosion protection and has one inlet and two outlet locations. Capacity is 454 litres. A similar tank, the Solarmate, is available with a 273-litre capacity and with optional locations for inlet and outlet connections.

Made in Canada

SOL-710

This polyethylene, 450-litre tank features an immersed copper-coil heat exchanger, fibreglass insulation, a vinyl slip-on jacket, and a thermometer. A stainless steel inner tank is optionally available instead of the immersed coil. The SOL-710 is designed for use in drain back systems.

Made in Canada

Manufactured by:
Solarsystems Industries Ltd.

2-11771 Horseshoe Way
Richmond, British Columbia
V7A 4S5

Blair D. Salter
(604) 271-2621

SOL-730

This cylindrical, fibreglass storage tank comes with an immersed coil heat exchanger sized for the particular application. Tank capacities are 600, 900, 1360, 1800, 2270, 3180, 4540, 6800 and 9080 litres. The tanks come with 100mm of fibreglass insulation and a vinyl jacket cover. The tank is intended to be used in general commercial applications.

Made in Canada

Manufactured by:
Solarsystems Industries Ltd.

2-11771 Horseshoe Way
Richmond, British Columbia
V7A 4S5

Blair D. Salter
(604) 271-2621

SOL-750

Manufactured by:
Solarsystems Industries Ltd.

2-11771 Horseshoe Way
Richmond, British Columbia
V7A 4S5

Blair D. Salter
(604) 271-2621

SOL-750 storage tanks consist of an inner heat-welded PVC liner, an outer wood panel shell with steel banding for hoop strength, fibreglass insulation, a copper-coil heat exchanger and bulkhead fittings for pipe connections. SOL-750 tanks are sized from 1 810 to 34 900 litres. Tanks up to 16 540 litres are shipped fully assembled while larger tanks are shipped knockdown for assembly on-site. The largest component is approximately 1.2 metres by 2.4 metres, and all components can be carried through a standard doorway.

Made in Canada

PET-100

Manufactured by:
Sol-Way Solar Engineering Ltd.

942 S.W. Marine Drive, Suite 30
Vancouver, British Columbia
V6P 5Z2

J.L. Richardson
(604) 324-3327

The Sol-Way PET-100 is a tank-in-tank heat exchanger-storage tank combination featuring an outer 454-litre polyethylene storage tank and an inner 159-litre stainless steel tank. The polyethylene outer tank is non-pressurized and is insulated with vinyl-jacketed fibreglass. Thermal effectiveness of the heat exchanger is a function of flow-rate, and in residential DHW applications ranges between 0.45 and 0.85. A copper-coil heat exchanger is available instead of the inner stainless steel tank.

Made in Canada

2.7 Handling Units

Solar Heat Transfer Module

The Bell and Gossett Solar Heat Transfer Module is a steel frame pre-assembled with two pumping systems, heat exchanger(s), circuit setters, and controls. The system provides a heat exchanger package to isolate the collector circuit from the solar energy storage tank and other circuits, such as when the collector circuit must be filled with anti-freeze. Two sizes are offered, depending on the amount of solar heat gain. A solar design manual is available.

Made in USA

Distributed by:

Bell and Gossett

ITT Fluid Products Canada
55 Royal Road
Guelph, Ontario
N1H 1T1

(519) 821-1900

Nortec Unipack

This pre-assembled DHW liquid handling module contains a double-walled heat exchanger, two circulating pumps, a differential controller, expansion tank and a fill/drain assembly. The pumps are a Taco Circular 007-F2 and a March Circular 809 The differential controller is a Honeywell R-7412 A.

Made in Canada

Manufactured by:

Nortec Solar Industries Inc.

P.O. Box 760
Manotick, Ontario
K0A 2N0

Jim Ramsden
(613) 692-2513

Solarplast SP-200

Manufactured by:

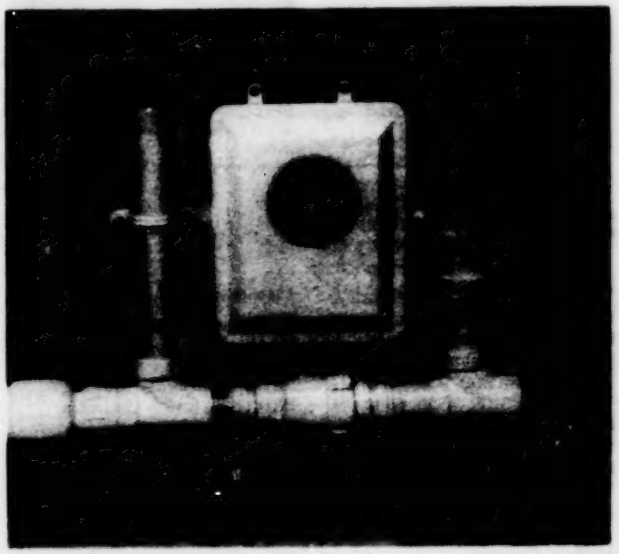
Solarplast Ltd.

1045 Hargrieve Road
London, Ontario
N6E 1P6

David Ritchie
(519) 685-1480

This pre-wired, pre-plumbed control assembly is designed for wall mounting for swimming pool solar heating systems. The weatherized metal case opens for access to the automatic control panel and closes with a gasket and a lock. The box contains the control logic and the drive motor that powers the ball valve. Mounted directly to the control box are the water lines to and from the pool, the water lines to and from the collectors, a flow control valve, temperature sensor, and a motorized ball valve.

Made in Canada



Solartech SAM Solar Air Mover

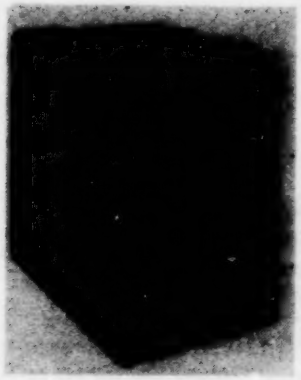
The Solartech SAM Solar Air Mover is a pre-assembled air handling unit, complete with variable flow blower, duct openings, two powered dampers, and a solid-state controller. The sheet metal box comes as a single unit measuring 610mm × 914mm × 914mm. The four operating modes are space heating directly from the collectors, space heating from storage, storing heat from collectors, and space heating from an auxiliary source. An optional factory-installed air-to-water heat exchange coil is available for domestic water preheating.

Made in Canada

Manufactured by:
Solartech Ltd.

39 Cranfield Road
Toronto, Ontario
M4B 3H6

Tim Hankinson
(416) 752-4990



Sunglo 410AKM

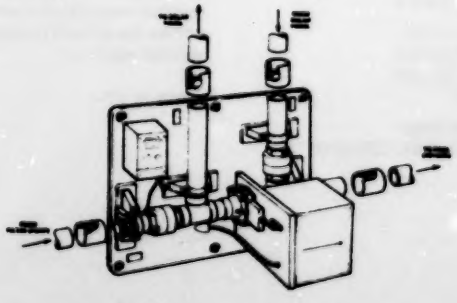
The Sunglo 410AKM automatic control is a complete board-mounted solar control module for swimming pool applications. It includes temperature sensors, a temperature meter, a variable maximum pool temperature adjustment, built-in electronic freeze protection, a 12 VDC motorized slide valve, two check valves and an integral patented flow venturi. Supply voltage can be 110 or 220 VAC, 50/60 cycle.

Made in Canada

Manufactured by:
Sunglo Solar Ltd.

1081 Alness Street
Downsview, Ontario
M3J 2J1

Joe Sherman
(416) 661-2560



Watershed Air Handling Units

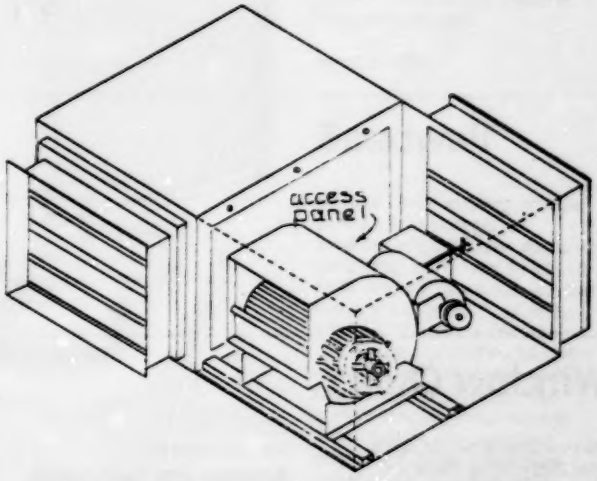
Manufactured by:
Watershed Energy Systems Ltd.

97 Six Point Road
Etobicoke, Ontario
M8Z 2X3

Judith Ramsay
(416) 233-3241

Watershed Air Handling Units have a double blower designed to produce uniform air flow rates under all three modes of operation: collector/storage, collector/load, storage/load. Double blowers allow pressure matching, so that air velocities and collector efficiencies remain stable whether air is being circulated through storage or through the living space. Units are arranged in parallel with the backup system. Includes differential controller, digital temperature display, and low-leakage dampers. Units are available to service system flow rates from 400 CFM to over 2400 CFM.

Made in Canada



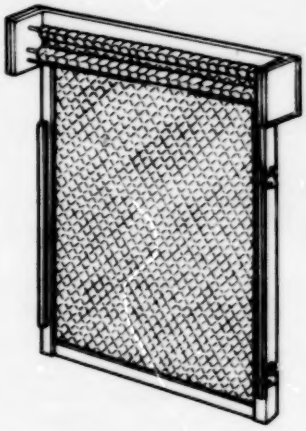
2.8 Insulated Windows, Shutters, and Blinds

Winsulshade

Winsulshade is an interior mounted movable insulation for windows, doors, skylights, and greenhouses and consists of three layers of material: quilted fabric on the room side, metalized polyester in the middle, and an opaque flexible vinyl on the window side. The shade rolls up above the window and in use is sealed against the window trim by a clamping mechanism. The unit operates manually or can be motorized and works in any position from horizontal to vertical, including curved surfaces.
Available in kits or dealer-installed.

Made in Canada

Manufactured by:
Altech Industries
238 King Street North
Powassan, Ontario
P0H 1Z0
Brian Lumley
(705) 724-2911



Window Quilt

Window Quilt is an insulating blind that rolls up above the window, slides in tracks along the sides, and seals against the window sill with a gasket along the bottom. The five-layered blind is insulated with two layers of polyester batting separated by a reflective aluminized vapour barrier, and faced with an ultraviolet-resistant polyester fabric. The layers are laminated with an ultrasonic bonding which does not perforate the inner vapour barrier. Widths range from 0.6 to 2.5 metres in any length. A magnetic-tape version is also made.

Made in USA

Manufactured by:
Appropriate Technology Corp.
Box 975, Green Street
Battleboro, VT
USA 05301
(802) 257-4501

Distributed by:
Canadian G.E.M. Industries Ltd.
P.O. Box 403
3060 Lakeshore Blvd. West
Oakville, Ontario
L6L 5A8
(416) 827-8446

Lakal-bloc

Available from:
C.B.I. Inc.
21 Montcalm
Lévis, Québec
G6V 5N6
Guy Bégin
(418) 837-8863

Lakal-bloc is a roll-up insulated slat-type blind for exterior use. The slats are aluminum-faced, contain polyurethane foam insulation, and slide in a track along the edges. Widths up to 4.5 metres and lengths to 2.5 metres. Manual or electric models are available.

Made in France

Thermo Shutter

Manufactured by:
Insul Shutter Inc.
Box 338
Silt, CO
USA 81652
(303) 876-2743

Distributed by:
Thermo Shutter
1662 Bonhill Road, Unit 15
Mississauga, Ontario
L5T 1C4
(416) 672-2242

Thermo Shutters are wooden bi-fold panels insulated with aluminum foil-covered polyurethane foam. The shutters come in their own frame which replaces the casing in new construction. A polyurethane foam provides a tight seal between shutters and frame.

Made in USA

Kool/Wall

Manufactured by:
KoolShade Corp.
722 Genevieve Street
Box 210
Solana Beach, CA
USA 92075
(714) 755-5126

Distributed by:
Enjay Sales
P.O. Box 8466
Postal Terminal
Ottawa, Ontario
K1G 3H9
Jay Jayaraman
(613) 225-3800/226-2266

Kool/Wall is a roll-up blind-type screen system for exterior use on commercial buildings. The system consists of a sensor and roller drive assembly outside the building and a control unit mounted inside. The system responds to light, wind, or temperature, and lowers the screen outside the window to reduce glare or heat flow. Manual controls over-ride the sensors and control the screen positioning for window washing.

Made in USA

Heat Trap

Heat Trap is a complete glazed window assembly with an interior roll-up curtain and electric drive. The double-glazed window unit measures 1450mm by 2210mm, and up to five such units can be controlled by one drive unit. An exterior mounted sun sensor triggers the drive unit to roll up the curtains automatically during sunny days and to close them at night. In summertime, the operation can be reversed to eliminate heat gain. The curtain consists of four layers of metalized polyester which unroll to form air spaces. The curtain seals at the edges with a magnetic strip to form dead air spaces. A manual switch can be used to control the curtain.

Made in Canada

Manufactured by:
Passive Solar Products Ltd.

2234 Hanselman Avenue
Saskatoon, Saskatchewan
S7L 6A4

John Nesbitt
(306) 244-7511

Heat Mirror

Heat Mirror is a film consisting of a selective coating on a polyester substrate, which works by transmitting short wavelength solar rays while blocking by reflection the longer wavelength heat rays. Heat Mirror is used as the centre pane of a triple-glazed insulated glass unit which is visually indistinguishable from conventional multiple-glazed units. The film has a visible light transmittance of 86%, a solar transmittance of 73%, and an emissivity of 15%.

Made in USA

Manufactured by:
The Southwall Corp.

3961 East Bayshore Road
Palo Alto, CA
USA 94303

(415) 962-9111

Sunergy

Sunergy Insulating Curtains are constructed of one or more layers of high reflectance/low emittance fabric which roll up above the window when not in use. Large window areas can be automated. A Velcro strip along the top of the fabric allows the addition of an interior decorative fabric. The system comes as a kit.

Made in Canada

Manufactured by:
Sunergy Systems Ltd.

R.R. #2
Carstairs, Alberta
T0M 0N0

Michael Kerfoot
(403) 335-4988

Thermal Shade

Thermal Shade is a roll-up insulating window blind that seals around the edges with magnetic strips. The shade is composed of five layers, including a reflective foil moisture barrier and two layers of fibrefill insulation that are ultrasonically bonded. The shade can also be used in summer to keep out heat gain.

Made in USA

Distributed by:
Advanced Idea Mechanics Ltd.

26 Ski Valley Crescent
London, Ontario
N6K 3H3

(519) 471-5573

Beadwall

Beadwall self-insulating window panels are double-glazed windows which become insulated walls when white foam beads are blown into the space between the two layers of glass. To clear the windows, the beads are drained and returned to the remote motor storage unit through a conduit concealed in the ceiling. The system includes motor-storage units charged with expanded polystyrene beads, aluminum panel frames including bead plumbing ducts and valves, installation hardware, and an anti-static agent.

Zomeworks also makes Skylid louvers, self-operating, insulated, reflective panels that are installed beneath skylights. The operating mechanism for the shutters is a steel canister charged with a refrigerant which opens or closes the louvers in response to temperature changes. A manual over-ride permits the louvers to be held in a closed or partially closed position to control light or glare. Two profiles of louver are available.

Made in USA

Manufactured by:
Zomeworks Corp.

Box 712
Albuquerque, NM
USA 87103

Joe Minella
(505) 242-3552

Heat Maze Window

The Watershed Heat Maze Window is a convection suppressant glazing assembly. The unit is double-glazed with standard float glass. Between the two layers of glass are horizontal strips of Llumar polyester transparent film. The framing members are extruded aluminum with polyvinyl chloride extrusions. The standard panel dimensions are 1962mm × 895mm with a thickness of 93.7mm.

Made in Canada

Manufactured by:

Watershed Energy Systems Ltd.

97 Six Point Road
Etobicoke, Ontario
M8Z 2X3

Bruce Morton
(416) 233-3241

2.9 Air-to-Air Heat Exchangers

Air Changer

The Air Changer was developed for super-insulated air-tight houses where controlled air change is essential. Made from a galvanized steel casing with a plastic laminar core, the unit is designed for horizontal mounting and fits between floor joists in the basement or hangs from the ceiling. The Air Changer comes with two 24 volt, 100 CFM computer-grade fans, sensors and electronic controls, including an automatic defrost. A larger model is available for agricultural applications.

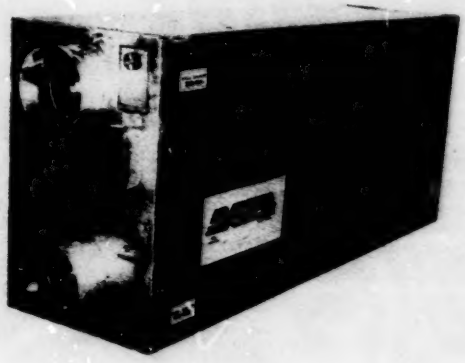
Made in Canada

Manufactured for:

Allen-Drerup-White Ltd.

334 King Street East
Studio 505
Toronto, Ontario
M5A 1K8

L. Frith
(416) 863-1762



Conservation Energy Systems

Manufactured by:

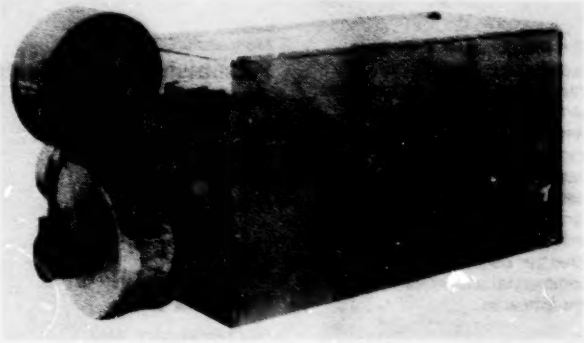
Conservation Energy Systems Inc.

Box 8280
Saskatoon, Saskatchewan
S7K 6C6

Rick Olmstead
(306) 665-6030

Conservation Energy Systems (CES) offers two air-to-air heat exchangers: the R200 air exchangers use a double cross-flow system which provides energy-efficient ventilation for new or retrofitted homes. The case is painted galvanized steel with an inner lining of fiberglass insulation. Operating controls include a variable speed fan, humidity control by dehumidistat, and auto-defrost by thermostatic shut-off of outside air. The P700S is a single cross-flow air exchanger designed to ventilate indoor swimming pools which require dehumidification and ventilation to maintain indoor air quality. The P700S may be ceiling-hung or floor-stand mounted. Belt-driven centrifugal fans (not supplied) provide air flows up to 330 litres per second.

Made in Canada



Blackhawk

The Blackhawk air-to-air heat exchanger is of all plastic construction. The unit is self-draining with a separate exhaust and intake fan module. The heat exchanger is cylindrical and is available in a number of sizes with a maximum capacity of 165 litres per second.

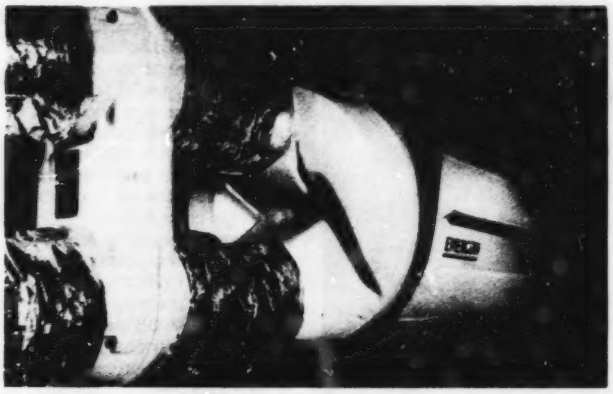
Made in Canada

Manufactured by:

Blackhawk Industries Inc. (formerly Enercon)

607 Park Street
Regina, Saskatchewan
S4N 5N1

Tony Repushka
(306) 924-1551



Lossnay

The Mitsubishi air-to-air heat exchanger is capable of transferring both latent heat and sensible heat to incoming ventilation air. The core is constructed from a specially treated paper through which water vapour can permeate. A range of exchanges are available with air flow rates from 12 to 3336 litres per second. Residential, commercial and industrial units are available.

Made in Japan

Manufactured for:

Mitsubishi Electric Sales America Inc.

3030 E. Victoria Street
Compton, CA
USA 90221

(213) 537-7132

Distributed by:

Infra Ray Heating Systems Ltd.

5678 Production Way
Langley, British Columbia
V3A 4N4

(604) 530-0627/530-9581

Team West Energy Products Ltd.

10105 - 97th Avenue, Suite 101
Grand Prairie, Alberta
T8V 0N5

(403) 539-5340

Zero Energy Products

2218 Avenue C North
Saskatoon, Saskatchewan
S7L 6T3

(306) 665-2022

2.10 Collector Mounting Frames

Kee Klamp

Kee Klamps are malleable galvanized iron slip-on pipe fittings with up to five case-hardened set screws depending on the number of pipes to be connected. The fittings are used with standard schedule 40 galvanized iron plumbing pipe, available locally. No welding, drilling, or threading is required. The fittings are reusable.

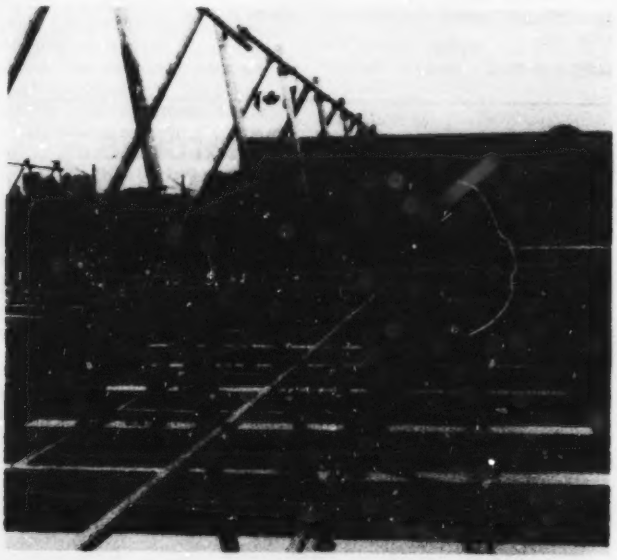
Made in England

Distributed by:

Kee Klamp Division

Gascoigne Industrial Products Ltd.
159 Rayette Road
Concord, Ontario
L4K 1C7

(416) 669-1494



Walmar Solar Support System

The Walmar solar support system is fabricated from pre-cut galvanized steel channels with connections made with either Unistrut nuts or bolts or Teks self-tapping metal screws. The system is adjustable to accommodate on-site variances and no shimming or levelling is required. The system is fully adaptable to any size or type of panel. Each application is custom-designed and certified by a professional structural engineer.

Made in Canada

Manufactured by:

Walmar Division of KF-RB Agencies Ltd.

15 Caesar Avenue
Nepean, Ontario
K2G 0B1

Ken Frank
(613) 225-4615

Triodetic

Triodetic mounting frames are fabricated from aluminum tubular struts with special connectors. The frames are available in a variety of modular sizes and each application is custom-designed.

Made in Canada

Manufactured by:

Triodetic Building Products Ltd.

2753 Fenton Road
Ottawa, Ontario
K1G 3N3

(613) 822-2922

2.11 Photovoltaics

ASEI-15 Portable Sun Pump

The ASEI-15 Portable Sun Pump is a light-weight self-contained system comprising a 250-watt photovoltaic array, a pumpset, an electronic controller which matches pump load to sunshine, and a mounting frame. Yield is 2.5 L/sec at a lift of 4.5 metres. Larger units are available.

Made in Canada

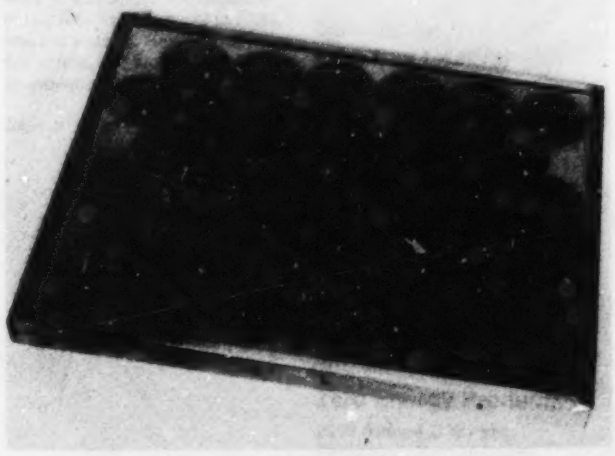
Manufactured by:
Agroecolar International
Box 8004
Billings Bridge Plaza
Ottawa, Ontario
K1G 3H6
(613) 733-2100

Silonex 5622

Silonex, formerly National Semiconductors Ltd., manufactures the NSL-5622, an 18-watt module consisting of 36 76mm silicon photovoltaic cells. The cell uses a single crystal manufactured through the Czochralski process. The frame and base plate of the module are constructed from stainless steel. The face plate is tempered textured glass and the sealing is silicone rubber with polyisobutylene edge sealant. The module has a nominal output of 16 volts, a current of 1.15 amps and a power of 18 watts.

Made in Canada

Manufactured for:
Silonex Inc.
2150 Ward Street
Montréal, Québec
H4M 1T7
(514) 744-5507



Solarex Panels

Solarex produces modular photovoltaic panels ranging from 4 to 48 volts with peak outputs from 2.5 to 37 watts. Panels are manufactured to Jet Propulsion Laboratory environmental test specifications. Generator packages come with panels, storage, and voltage regulators. Solar-powered toys are also available.

Made in USA

Manufactured by:
Solarex Corp.
1335 Piccard Drive
Rockville, MD
USA 20850
(710) 328-9709

Distributed by:
Lenbrook Industries Ltd.
1145 Bellamy Road
Scarborough, Ontario
M1H 1H5
(416) 438-4610

Solarcells 36S1P

The 36S1P is a 36-cell, 18-watt peak power photovoltaic module. Each cell is 76mm in diameter. The nominal output of the module is 12 volts, while the nominal output current is 1 amp at standard conditions. The cover plate is a low-iron tempered glass. Temperature range is from −40°C to 75°C.

Made in Canada

Manufactured by:
Solarcells Ltd.
Box 1025
Burlington, Ontario
L7P 3S9
D. Adkinson
(416) 335-4713

Solar World PP33

The Solar World PP33 is an 18-watt module consisting of 33 silicon photovoltaic single crystal cells with a P.N. junction. Nominal output is 14 volts and the output current is 1.3 amps.

Made in Canada

Manufactured by:

Solar World Heating Systems Corp.

3814 Victoria Park Avenue
Willowdale, Ontario
M2H 3H7

Garry McKinnon
(416) 494-5829

TPK Panels and Systems

TPK Solar Systems' aluminum-framed panels are available in three sizes with a typical output of 15 volts DC and 1.0, 1.15 or 1.3 amps. The component cells are available separately. The SC2-NP2 is a 50mm diameter single crystal silicon cell with a typical output of 0.5 volts DC at 0.4 amps. The SC1-PN3 75mm diameter single crystal silicon cell has a typical output of 0.5 volts DC at 1.15 amps. Both cells are solderable.

A photovoltaic water pump is also available, with a pumping capacity of 9 litres per minute at a head of 61 metres.

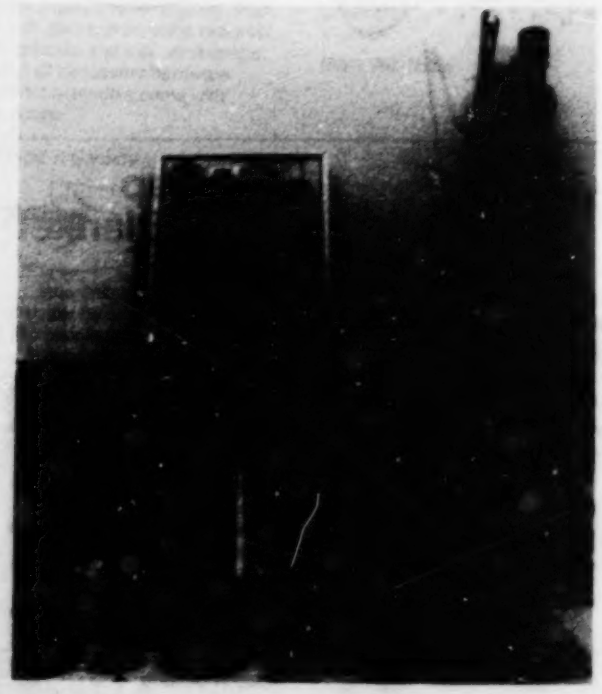
Made in Canada

Manufactured by:

TPK Solar Systems Inc.

149 Bentley Avenue, Bay 4-A
Nepean, Ontario
K2E 6T7

R.E. Thomas
(613) 225-4403



2.12 Insulating Swimming Pool Covers

Air-Cells Solar Pool Cover

Air-Cells Solar Pool Covers are made of heat-sealed polyethylene and can be cut to fit any shape of pool. The material is 12 mil, tinted blue, and treated to withstand the sun's ultraviolet rays.

Made in Canada

Manufactured by:

Bonsail Import and Export Inc.

60 Nably Court
Scarborough, Ontario

(416) 298-6928

Blue Shield Thermal Pool Blankets

The Blue Shield Thermal Pool Blanket is constructed of a 3mm (⅛ inch) thick blue cross-linked closed cell polyethylene foam which is laminated to a layer of black woven Dupont Fabrene with a 1 mil blue coating on the surface. The closed cell foam has a buoyancy of 913 kg/m^3 (57 lb./cu.ft) and has a thermal resistance of RSI 0.28 (R 1.6). The Fabrene is ultraviolet-resistant. Blue Shield is available in a variety of standard sizes for rectangular and round pools. Custom-sized stainless steel and aluminum EZE rollers are also available.

Made in Canada

Manufactured by:

Dauncey Sayles Thermal Engineering

1080 Brock Road, Units 11 & 12
Pickering, Ontario
L1W 3H3

Larry Dauncey
(416) 831-1232

Heli-Fab Solar Roller

Manufactured by:

Heli-Fab

1865 Sargeant Avenue, Bay 16
Winnipeg, Manitoba
R3H 0E2

Ray Haydaman
(204) 774-9602

The Heli-Fab Solar Roller attaches to the pool cover with pressure-sensitive Velcro strips and allows the cover to be rolled up at the end of the pool. The roller's legs are anchored with pins slipped into holes in the concrete, allowing the entire roller and blanket to be moved for storage. Construction features 75mm (3 inch) diameter aluminum tubing, welded aluminum ends with plastic bushings, and a rubber-grip handle.

Made in Canada

Nite Cap Foam Blanket

Manufactured by:

H.S.T. Synthetics Ltd.

2550 Goldenridge Road, Unit 38
Mississauga, Ontario
L4X 2S3

Mr. T. Tiller
(416) 275-3382

Nite Cap foam insulating pool blankets are constructed with one layer of 3mm (⅛ inch) closed cell polyethylene foam laminated to the underside of a black woven polyethylene fabric by means of a 1 mil polyethylene film. A 1.25 mil ultraviolet-stabilized blue polyethylene coating is then applied to the top side. The foam fabric is cut to fit in-ground and above-ground pools of all shapes and sizes. The foam panels are sewn together with a UV-stabilized polypropylene thread so that the seams run across the width of the pool.

Made in Canada

V.I.P. Solar Pool Blanket

Polytarp Products manufacture single laminate bubble-type blankets for in-ground and above-ground pools.

Made in Canada

Manufactured by:

Polytarp Products

11 Lepage Court
Downsview, Ontario
M3J 2A3

(416) 633-2231

Rocky's Easy-Roller

The Easy-Roller is a pool cover roller system that comes in four basic models: portable, permanent, above-ground, and commercial. The roller is made of 100mm (4-inch) aluminum tubing with a baked white enamel finish. Each package contains brackets, grommets and tool, vinyl straps, and all necessary hardware. Portable models come with castors.

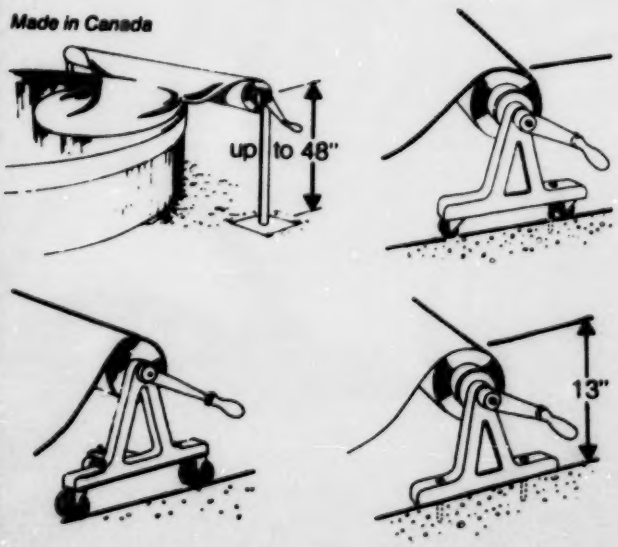
Made in Canada

Manufactured by:

Rocky of B.C. Leisure Ltd.

1372 Main Street
North Vancouver, British Columbia
V7J 1C7

(604) 985-0525



Sealed Air Solar Pool Blanket

Manufactured by:

Sealed Air of Canada Ltd.

95 Glidden Road
Brampton, Ontario
L6T 2H8

Linda Verner
(800) 268-0807 Toll Free

The Sealed Air Solar Pool Blanket is made of translucent light-blue polyethylene with air-filled bubbles. Ultraviolet inhibitors have been added to extend the service life. Seams are joined with a heat seal. Available in round, oval, and rectangular shapes in various sizes. A reel system is also offered.

Made in Canada

R-SOL Roller

Manufactured by:

Solarmec Ltée.

386 Blvd. Harvey
Jonquière, Québec
G7X 3A2

(418) 547-8551

The R-SOL Roller is made with a 100mm (4-inch) diameter anodized aluminum roller, with polyethylene brackets and handles at each end. Height is 350mm (14 inches) and the length is up to 9.14 metres (30 feet). The roller can be wall or deck mounted.

Made in Canada

3. Parts and Materials

AFG Sunadex and Solatex

AFG manufactures two low-iron tempered glass products for use in solar collectors. Sunadex is a rolled water-white glass with a lightly-textured surface to reduce glare. It has a solar transmissivity of 91% and an iron-oxide content of 0.01%. Soletex is designed for flat plate collectors and for non-vision areas of passive systems. It has a lightly-textured surface to reduce glare, an iron-oxide content of 0.04%, and a solar transmissivity of 89%. Both glazings are available in standard and special sizes in three different thicknesses.

Made in USA

Manufactured by:
AFG Industries Inc.
Box 929
Kingsport, TN
USA 37662

Distributed by:
Tempglass Ltd.
131 Ormont Drive
Weston, Ontario
M9L 2S3

Sales Office
(416) 749-7932

Filon

Filon panels are manufactured with acrylic-fortified polyester resin reinforced with fibreglass. They contain ultraviolet absorbers to reduce colour degradation. The Tedlar surface provides additional ultraviolet protection plus protection from surface degradation.

Made in Canada

Manufactured for:
Atlas Asbestos
5600 Hochelaga
Montréal, Québec
H1N 1W1

Sales Department
(514) 259-2531

Lexan

Lexan is a clear polycarbonate plastic glazing suitable for use in solar collectors and in windows, skylights, and other applications requiring impact resistance. Its solar transmittance is in the 81% to 87% range and it has a maximum continuous use temperature of 95°C. Short-term exposure to higher temperatures such as 135°—140°C is not damaging, but long-term exposure can cause a reduction in impact strength. Lexan is available in several weights in clear or transparent colours. UL listed.

Made in USA

Manufactured for:
Canadian General Electric Company Ltd.
1025 Lansdowne Avenue
Toronto, Ontario
M6H 3Z6

(416) 534-6511

Dura-Film

Manufactured by:
CIL Plastics
Canadian Industries Ltd.
45 Sheppard Avenue
Willowdale, Ontario
M2N 5W9

Sales Department
(416) 226-7272

Dura-Film is an ultraviolet-stabilized polyethylene film for use in greenhouse applications.

Made in Canada

Acrylite and Cyrolon SDP

Manufactured by:
Chemacryl Plastic Ltd.
73 Richmond Street West, Suite 500
Toronto, Ontario
M5H 2A2

Sales Office
(416) 869-0013

SDP extruded double-skinned plastic sheet is used for greenhouses, skylights, solariums, and other building uses, but not for solar collectors. The internally ribbed configuration of these sheets traps air to provide an insulating value comparable to insulating glass. Panels are load-bearing but non-structural. Acrylite SDP, an acrylic product, and Cyrolon SDP, a polycarbonate, are both 16mm thick and are available in a standard width of 1200mm (47¼ inches) in lengths of 2.4, 3, 3.6 and 4.9 metres (8, 10, 12 and 16 feet). Custom lengths and an aluminum/EPDM glazing installation system are also available.

Made in Canada

C.E. Heliolite

Manufactured by:
Combustion Engineering Inc.
825 Hylton Road
Pennsauken, NJ
USA 08110

(609) 662-0400

Heliolite is a tempered low-iron glass with a maximum iron-oxide content of 0.03%. A prismed surface pattern decreases specular reflectance and eliminates glare. It is available in standard and custom sizes for flat plate collectors and passive greenhouse applications.

Made in USA

DuPont Tedlar

Tedlar PVF film is a tough, weather-resistant film able to withstand chemical and temperature extremes. Light transmittance is 90% and, if properly mounted, the glazing can withstand temperatures up to a maximum of 176°C for short periods of time. Tedlar is recommended as an outer glazing but it must be applied to the glazing frame according to the manufacturer's recommended process.

Made in USA

Distributed by:
DuPont Canada Inc.

789 Don Mills Road
Don Mills, Ontario
M3C 1T5

Vic Hansen
(416) 362-5621

Teflon Solar Film

Teflon Solar Film is recommended as inner glazing for solar collectors. Its light transmittance is 96%; its temperature limit is 204°C. Teflon has been tested to fifteen years durability and should be installed according to the manufacturer's recommended procedures.

Made in USA

Manufactured by:
E.I. DuPont de Nemours and Company Inc.

Plastic and Resins Dept.
Wilmington, DE
USA 19898

Distributed by:
Chemplast Inc.

2450 Dunwin Drive
Mississauga, Ontario
L5L 1J9

Bob Bowman
(416) 828-2100

Excelite

Excelite is made from light-stabilized polyester resin with glass-fibre reinforcement. The material has good weathering and high light transmission properties. Widths vary from 0.6 to 1.2 metres and stock roll lengths vary from 2.4 metres to 15 metres.

Made in Canada

Manufactured by:
Graham Products Ltd.

Box 2000
Inglewood, Ontario
L0N 1K0

Sales Dept.
(416) 457-5290

Llumar Polyester Films

Martin Llumar polyester film is clear, weather-resistant film, suitable for the outer glazing for solar collectors or for greenhouse glazing. It is impregnated with ultraviolet absorbers to give it a life expectancy of about 10 to 15 years. The upper temperature limit is 176°C and it can continue to function at stagnation temperatures of more than 204°C. Light transmission is 88%—90% with a sharp cut-off at 0.4 microns in the ultraviolet spectrum. It is available in continuous rolls in widths from 6 to 1.5 metres. Thickness is 0.127mm (0.005 inches).

Made in USA

Manufactured by:
Martin Processing Inc.

Film Division
Box 5068
Martinsville, VA
USA 24112

Distributed by:
Chemplast Ltd.

2450 Dunwin Drive
Mississauga, Ontario
L5L 1J8

Bob Bowman
(416) 828-2100

Tuffak and Plexiglas

Rohm and Haas manufacture two plastic glazings suitable for use in solar collectors and other solar applications. Both Plexiglas acrylic and Tuffak polycarbonate have about half the weight of glass with a greater impact strength. Maximum service temperatures are 93°C (200°F) for Plexiglas and up to 121°C (250°F) for Tuffak. Solar transmittance ranges from 80% to 90%, depending on material thickness. In the form of Tuffak-Twinwal, polycarbonate is available as a double-walled extruded sheet.

Made in USA

Distributed by:
Rohm and Haas Canada Ltd.

2 Manse Road
West Hill, Ontario
M1E 3T9

(416) 284-4711

Kalwall Sunlite

Kalwall Sunlite glazing is a lightweight, shatterproof fibreglass-reinforced polyester (FRP) with a solar transmission of 85% to 90%. Sunlite diffuses light and screens out ultraviolet, making it suitable for greenhouses, skylights, and other passive applications. Kalwall Sunlite Premium II is more resistant to heat, moisture, ultraviolet, and dry heat degradation and is recommended for applications where the glazing may be exposed to temperatures above 65°C (150°F) for extended periods. Both products are available in a variety of widths, lengths, and thicknesses. An exterior weatherable coating is factory-applied, and should be reapplied approximately every seven years to restore the original finish. Prefabricated, double-glazed panels, skylights, mounting accessories, and a two-tank, double-glazed, box-type solar water heater are also offered.

Made in USA

Manufactured by:

Solar Components Corp/ Kalwall

Box 237
Manchester, NH
USA 03105

Distributed by:

The Sun Catchers

110 Garrioch Ave.
Winnipeg, Manitoba
R3J 2T3

(204) 889-6767

Energy Alternatives Ltd.

Box 671
Amherst, Nova Scotia
B4H 4B8

Stuart Lindsay
(902) 667-2790

Flexigard

Flexigard is a laminated transparent thin-film plastic glazing for storm windows and greenhouses and for the outer glazing on solar collectors. The product contains ultraviolet absorbers and has a light transmittance of 88—90%. The operating temperature range is from −60°C to 135°C, and the film shrinks slightly in the 0°C to 100°C range. Twelve-year outdoor weathering tests have been successfully completed.

Made in USA

Manufactured for:

3M Canada Inc.

Energy Control Products
P.O. Box 5757
London, Ontario
N6A 4T1

Carl Pollock
(519) 451-2500

3.2 Absorbers and Coatings

Solar Selective Sheet

Alcan produces a black, solar, selective, coated aluminum sheet for use as an absorber plate in both air and liquid flat plate collectors. Coils of aluminum sheet are coated with a black coating consisting of submicron oxide particles dispersed in a resin binder. Emissivity is 0.35 and absorptivity is 0.94. The product can be bent or formed without damage to the coating.

Made in Canada

Manufactured by:

Alcan Canada Products Ltd.

P.O. Box 269
Toronto-Dominion Centre
Toronto, Ontario
M5K 1K1

Karen Byrne
(416) 366-7211

Solar Strip and SunSponge

Solar Strip is a black chrome on copper strip. The absorptivity is 0.95 and the emissivity is 0.10. The strip can be roll-formed or crimped and soldered without damaging the selective coating. The standard width for the product is 600mm (24 inches); custom sizes are available. SunSponge is a coating of black chrome on a nickel base, electroplated onto a thin copper strip which has a pressure-sensitive adhesive on the back of the copper for lamination onto thermal storage surfaces such as masonry walls or metal storage tanks. Surface absorptivity is 0.94; emissivity is 0.10. SunSponge comes in rolls 600mm (24 inches) wide.

Made in USA

Manufactured by:

Ergenics, an Inco Company

Div. of MPD Technology Corp.
681 Lawlins Road
Wyckoff, NJ
USA 07481

(201) 891-9103

Distributed by:

Solartech Ltd.

39 Cranfield Road
Toronto, Ontario
M4B 3H6

David Wood
(416) 752-4990

Du-Lite

Distributed by:

DuPont Canada Inc.

Box 26
Toronto, Ontario
M5K 1B6

DuPont Du-Lite is a selective paint with an absorptivity of 0.95 and emissivity of 0.45. The fluoropolymer paint has to be applied with a very thin film thickness and coil coating is the recommended application. Spray application is an option although with the thicker film thickness, the emissivity of the coating will be higher.

Made in USA

Maxorb Solar Foil

Manufactured by:

Berry Solar Products

P.O. Box 327
Edison, NJ
USA 08817

(201) 549-3800

Maxorb Solar Foil is a thin nickel foil with black selective surface which can be used in solar collectors or in passive solar applications. Absorptivity is 0.97 and emissivity is 0.10. Maxorb is supplied in 150mm (6 inches) wide coils, uncoated or with a high-temperature, pressure-sensitive adhesive. Widths up to 450mm (18 inches) are available on special order.

Made in USA

Novamet 150

Manufactured by:

Ergenics, an Inco Company

Div. of MPD Technology Corp.
681 Lawlins Road
Wyckoff, NJ
USA 07481

(201) 891-9103

Distributed by:

Inco Metals Co.

First Canadian Place
Box 44
Toronto, Ontario

(416) 361-7511

Novamet 150 is a black inorganic coating in a water-base binder for solar absorbers. It can be applied to metallic or glass surfaces by spraying or brush painting without any undercoat. The coating has good high temperature stability and it retains its absorptance properties after prolonged exposure to temperatures as high as 800°C. The absorptivity of the coating is 0.96 and the emissivity is 0.84.

Made in USA

EJ Absorber Plate

The EJ absorber plate is an extruded, finned aluminum section (153mm wide × 33mm deep) designed for on-site assembly. The sections come in any lengths up to 7.3 metres. Alternative finishes include unfinished, black matt, Solar Sorb, or anodized black matt.

Made in Canada

Manufactured for:

Jenkins Solar Development

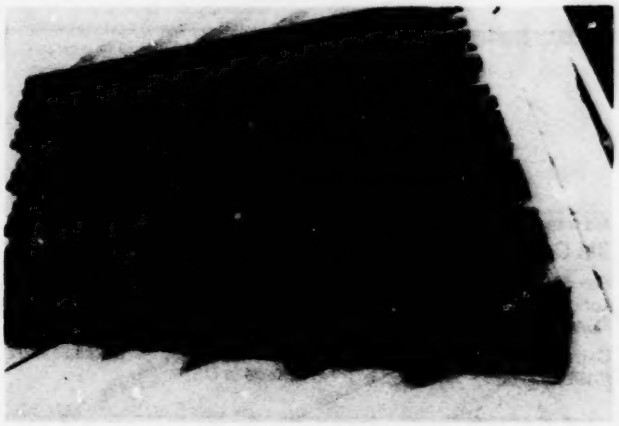
R.R. #2
Peterborough, Ontario
K9J 6X3

Distributed by:

First Co-operative Solar Co. Ltd.

R.R. #2
Peterborough, Ontario
K9J 6X3

Ernie Jenkins
(705) 745-9480



Solchrome

Manufactured by:

Solarsystems Industries Ltd.

#2-11771 Horseshoe Way
Richmond, British Columbia
V7A 4S5

Blair Salter
(604) 271-2621

Solarsystem's Solchrome selective black chrome strip is plated over nickel on a copper substrate. The absorptivity is 0.95 and the emissivity is 0.10. The copper thickness is 0.25mm and the width is 600mm (24 inches) and 900mm (36 inches). The surface is protected by an adhesive plastic strip and the selective strips can be cut, bent, and roll-formed with the plastic protector in place. The strip can be soldered on the back without damage to the black chrome surface. Customer materials can be plated and a paper separator is available as an option instead of adhesive plastic.

Made in Canada

3.3 Conductive Cement

Thermon

Manufactured by:

Thermon Canada Ltd.

431 Newbold Street
London, Ontario
N6E 1K2

(519) 681-1740

Thermon T-85 is a thermally conductive cement which may be used to bond tubing to absorber plates or to bond heat exchangers to the outside of hot water tanks to form a double-walled heat exchanger. Thermon T-85 has a temperature range from −190°C to +190°C; sheer strength bonding to substrate is from 6895 kPa to 12410 kPa if cured for 4 to 6 hours at 150—175°C or for 180 days at 21°C.

Made in Canada

3.4 Gaskets, Sealants, and Tapes

Cantherm Weatherstrip

Cantherm Weatherstrip is an EPDM-rubber which is resistant to aging, weathering, ozone, and sunlight. The product remains totally flexible at −40°C.

Made in Sweden

Distributed by:
Cantherm Products Ltd.
57 Galaxy Boulevard, Unit 6
Rexdale, Ontario
M9W 5P1
(416) 675-6390

GE RTV Silicone Rubber

GE RTV Silicone is a one-component sealant that offers excellent adhesion, flexibility, and high temperature performance. Both standard and high-temperature (315°C) types are available.

Made in USA

Manufactured for:
Canadian General Electric Company Ltd.
Silicones and Polymers Products
1025 Lansdowne Avenue
Toronto, Ontario
M6H 2Z6
(416) 534-6511

Dow Corning

Dow Corning makes a variety of silicone products for use in solar applications. Dow Corning 790 construction sealant is a low modulus, tear-resistant, silicone rubber material that can accommodate 50% expansion and contraction in a joint. It adheres to glass, metals, and most reinforced plastics.

Silastic silicone rubber, fabricated parts are used for a variety of solar applications, such as edge seals, grommets, hoses, and flange seals. Service range is from −45°C to 232°C and they are little affected by sunlight, moisture, ozone, and weathering.

Elastoplastic conformal coating is a transparent silicone which is resistant to moisture, ultraviolet, and weathering, and is used to protect solar cells and ceramic substrates.

Dow Corning 808 resin provides a hard but flexible transparent, protective film for reflective surfaces, and is also used in flat black solar silicone paints.

Made in USA

Manufactured for:
Dow Corning Canada Ltd.
6747 Campobello Road
Mississauga, Ontario
L5N 2M1
Hazel Booth
(416) 826-9600

Pawling Elastomeric Solar Components

Pawling preformed elastomeric sealing gaskets are manufactured in a variety of shapes. Standard items include snap-in manifold seals, glazing channels, and thermal breaks between absorber and casing. Material options include EPDM and silicone rubber.

Made in USA

Manufactured by:
Pawling Rubber Corp.
157 Maple Blvd.
Pawling, NY
USA 12564
(914) 855-1000

Scotch 425 Aluminum Foil Tape

Scotch 425 aluminum foil tape has an acrylic adhesive with a continuous-use temperature range from −54°C to 149°C, making it suitable for taping air collector duct-work.

Made in USA

Manufactured for:
3M Canada Inc.
Box 5757
London, Ontario
N6A 4T1
Carl Pollock
(519) 451-2500

Tedlar Tape

Tedlar weather-resistant tape comes with an acrylic adhesive. Total tape thickness is 0.09mm (3.5 mils) and temperature range is from −73°C to 107°C.

Made in Canada

Manufactured by:
3M Canada Inc.
Box 5757
London, Ontario
N6A 4T1
Carl Pollock
(519) 451-2500

Tremco

Tremco fabricates specialized EPDM gasket systems for solar collector applications.

Made in Canada

Manufactured by:
Tremco Canada Ltd.
220 Wicksteed Avenue
Toronto, Ontario
M4H 1G7
Dave Miller
(416) 421-3300

Thermaflex

Thermaflex is an insulated flexible air duct and comes in various diameter and pressure ratings. Duct liner is polymeric material bonded to a coated steel wire helix, also supporting a blanket of RSI 0.75 (R 4.3) fibreglass insulation. Different exterior jackets are available.

Made in USA

Manufactured for:

Automation Industries (Canada) Ltd.

Flexible Tubing Division
6860 Rexwood Road
Mississauga, Ontario
L4V 1L8

(416) 678-9215

Isatherm

Isatherm is a rigid isocyanurate foam insulation faced on both sides with aluminum foil. Thermal conductivity is 0.022W/m•°C at a 75°C mean temperature. Service temperature range is from −60°C to 80°C.

Made in Canada

Manufactured by:

Canadian Hanson Ltd.

45 Vansco Road
Toronto, Ontario
M8Z 5J7

(416) 255-1371

Thermax Insulation Board

Thermax Insulation Board is a glass-fibre reinforced polyisocyanurate foam between protective aluminum foil faces. Thermal resistance is RSI 0.5 per centimetre (R 7.2 per inch). The temperature range for the insulation is −73°C to 121°C, but the insulation can stand higher temperatures for small periods of time. The foil face prevents outgassing of the insulation.

Made in USA

Manufactured by:

Celotex Building Products Division

Celotec Corporation
Tampa, FL
USA 33622

Distributed by:

West Rock Industries Ltd.

2650 Lakeshore Highway
Mississauga, Ontario

H.R. Wakabayashi
(416) 823-9881

Fiberglas Insulation

Manufactured by:

Fiberglas Canada Ltd.

3080 Yonge Street
Toronto, Ontario
M4N 3N1

Head Office
(416) 482-2836

Fiberglas AW Insulation is a batt-type non-combustible wool with long, resilient, inorganic glass fibres bonded with a thermosetting resin. Thermal conductivity is 0.037 W/m•°C at 24°C mean temperature. Upper temperature limit is 510°C. Fiberglass AF Rigid Insulation is a fine-fibred, shot-free compressed insulation bonded with a thermosetting resin. Thermal conductivity is 0.036 for AF 530 at 24°C. Upper temperature limit is 232°C.

Two types of pipe insulation are available. Fiberglas one-piece insulation is extruded in a single round section and slit along its length for application on the pipe. It is sized to conform to standard iron piping and copper tubing. Fiberglas sectional pipe insulation is extruded in sections to conform to standard sizes of iron pipe and copper tubing. Both types are available unjacketed or with factory-applied all-service jacket. The thermal insulation value is RSI 1.4 for 50mm thickness. The upper temperature limit is 455°C and the lower limit is −85°C.

Made in Canada

Micro-Lok 650

Manufactured by:

Johns-Manville Canada Inc.

295 The West Mall
Etobicoke, Ontario
M9C 4Z7

Micro-Lok 650 is a rigid fibreglass pipe insulation for uses up to 345°C. It is molded from long, fine glass fibres and bonded with a resin in a one-piece construction. It is available in a range of pipe size. Thermal conductance is 0.033 W/m²•°C at 24°C mean temperature. Two jackets are offered: an all-purpose white kraft bonded to an aluminized vapour barrier, reinforced with fibreglass yarn, and a fibreglass fabric pre-sized with an incombustible coating and bonded to an aluminized vapour barrier.

Made in Canada

Foamglas

Foamglas is a light, rigid, cellular sealed glass insulation containing no organic materials or binders. Foamglas is available in sheets for use in solar collectors and storage tanks, or with a white vinyl jacket for piping. It is impervious to moisture. Thermal conductivity is 0.045 kcal/mh·°C at 10°C. Service temperature range is −273°C to 482°C.

Made in USA

Manufactured by:
Pittsburgh Corning Corp.
800 Presque Isle Drive
Pittsburgh, PA
USA 15239

Distributed by:
Glass-Cell Fabricators Ltd.
26 Greensboro Drive
Rexdale, Ontario
M9W 1E1
(416) 241-8663

Foam Edge Pipe Insulation

This polyurethane foam provides 12mm of insulation around the pipe, and an integrated vinyl jacket with ultraviolet inhibitors. Foam Edge can be used under continuous temperatures up to 121°C. A variety of sizes is available.

Made in USA

Manufactured by:
Teledyne Mono-thane
1460 Industrial Parkway
Akron, OH
USA 44310
(216) 633-6100

Solar-7

Solar-7 pipe insulation is a polyisocyanurate insulation with a value of RSI 0.48 per centimetre (R 7 per inch). The product is manufactured for either single or double pipe and to a variety of sizes and thicknesses. All sections are split in halves with an overlapping PVC jacket sealed by stapling with a special outward clinch staple and then the entire system is sealed with Tedlar.

Made in USA

Manufactured by:
Northeast Specialty Insulations Inc.
1 Watson Place
Saxonville, MA
USA 01701
(617) 877-0721

Distributed by:
Renndale Solar Associates Ltd.
5129 Tomken Road
Mississauga, Ontario
L4W 1P1
(416) 625-5371

Petro-Sun Inc.
2290 de la Métropole
Longueuil, Québec
J4G 1E6
(514) 670-8043

3.6 Reflective Surfaces

Scotchtint Solar Film

Scotchtint Solar Film is a highly reflective, high-strength metalized polyester film with a protective overcoating. Available with or without a water-activated, pressure-sensitive, weatherable adhesive backing, it has a reflectance of 85%, and is designed for outdoor use. A matching seaming tape is available.

Made in USA

Manufactured by:
3M Company
Energy Control Products
Box 5757
London, Ontario
N6A 4T1
Carl Pollock
(519) 451-2500

King-Lux Aluminum Reflector Sheet

The King-Lux Aluminum Reflector Sheet can be used for reflectors for various types of solar collectors. King-Lux is made of high-purity aluminum with a solar reflectivity of 89.5%. It has an anodic hard coating which is 2 microns thick, and shows a UV resistance of 0.05% degradation after 800 hours of exposure. King-Lux is available in sheets and coils in different finishes.

Made in USA

Manufactured by:
Kingston Industries Corp.
205 Lexington Ave.
New York, NY
USA 10016
Mark Sherwood
(212) 889-0190

Conserval

Conserval makes a wide range of energy-related monitoring and control equipment. The Model 52 differential temperature controller is designed for liquid or air systems. It has an ABS plastic case and includes heating and power LEDs. A load of up to 10 amps can be controlled with a range of optional adjustments such as collector minimum and storage maximum temperatures.

The Conserval Model 301 temperature monitor can accommodate up to 11 different sensors and features an ABS case, ON-OFF switch, and an 11 position sensor selector switch. Six sensors, with an accuracy of within 1°C, are included.

The Model 112 Solar Air Controller can regulate an entire solar and auxiliary heating system. It provides both the differential control for the solar portion as well as control of the back-up heating. Three LEDs indicate collection loop operation, storage heating loop, or auxiliary heating. Four temperature points can be monitored. Three relay outputs are provided and the unit operates on 24-volt power.

Conserval's Model 601 Energy Meter measures energy flow in hydronic systems. Two temperatures and a flow rate are measured to provide a readout in kilowatt-hours. The Data Logger 2000 has 16 analog inputs and the data can be printed out together with time and date. A back-up battery prevents loss of data for up to 24 hours.

A greenhouse controller and a commercial controller are also available.

Made in Canada

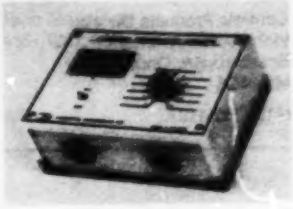
At press time it was learned that Conserval has changed its name and will henceforth be known as Paget Electronics Ltd.

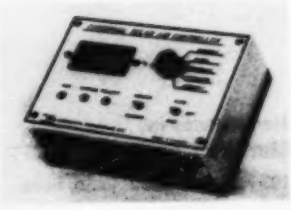
Manufactured by:

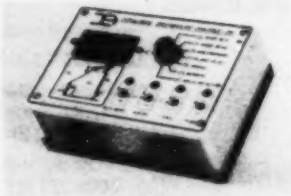
Conserval Products

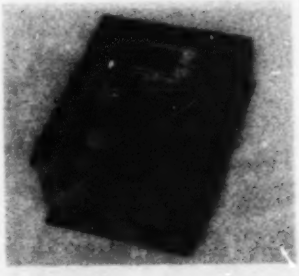
71 Industrial Avenue
Carleton Place, Ontario
K7C 3V7

(613) 257-7620









Delta-T Differential Thermostats

Manufactured by:

Heliotrope General

3733 Kenora Drive
Spring Valley, CA
USA 92077

(714) 460-3930

Distributed by:

Contact manufacturer for local Canadian distributor.

The Delta-T Differential Temperature Thermostat is an automatic motor control for solar heating systems, using an AUTO-MANUAL-OFF switch, solid-state components with mechanical relays including 4 operations amplifiers, and a variety of control differentials. Control options include freeze recirculation, and high and low temperature cut-out. An LED indicates when the pump is on. The output circuit is capable of handling ½ hp, 10 amps at 120 VAC.

The Helio-Logic 2100 Solar Controller is a multi-input, multi-output controller individually designed to fit the project requirements, using either a relay logic or a microprocessor-based controller. A maximum of 10 differential temperature functions, 8 set-point temperature locations, and a number of contact closures provide input to the controller. A maximum of 30 different temperatures can be sensed and adjustment knobs on the control boards allow up to 6 temperature settings. Optional features include a digital temperature readout with up to 20 selection switches.

The Helio-matic 1 is a control system for swimming pools or spas. The system includes differential controller, sensors, and the flow diverter. Differential ON at 1.6°C and OFF at 0.5°C. The controller can switch up to ½ hp at 120 volts, with optional power ratings of 2 and 3 hp at 120 VAC and 240 VAC respectively.

Made in USA

Honeywell Differential Controller

The R-7412 Differential Controller provides automatic control of circulating pumps, valves, damper motors, and other solar accessories. The circuit design is solid-state with mechanical relays. The standard differentials are 10°C ON and 2°C OFF. Options include recirculating freeze protection with freeze-sensing capability, drain down protection, and pump OFF over-temperature protection. Power input is 120 VAC, 60 Hz, and controller contact rating is 24 VAC at 6 amps.

Made in USA

Manufactured for:

Honeywell Ltd.

740 Ellesmere Road
Scarborough, Ontario
M1P 2V9

Head Office
(416) 293-8111

Johnson Differential Controller

Manufactured by:

Johnson Controls Inc.

Control Products Division
2221 Camden Court
Oakbrook, IL
USA 60521

Distributed by:

Johnson Controls Ltd.

Controls Products Division
929 Warden Avenue
Scarborough, Ontario
M1L 4C6

(416) 755-1137

The R-34 Series Differential Controller is solid-state and uses two Johnson 1000-ohm nickel wire-wound sensors as inputs. The ON differential is set at 11°C, and the OFF differential at 3°C. An adjustable high-temperature limit is also provided. Several other models are available.

Made in USA

Independent Energy Differential Controllers

Independent Energy C-30 differential controllers come in two models, one for systems requiring no freeze protection or recirculation freeze protection, and one for systems requiring freeze protection via positive action drain down valves. An adjustable storage high-temperature limit can be set from 40°C to 100°C. Two LEDs are provided for power ON and output ON indication. Three-position mode switch is provided for ON-AUTO-OFF operation and the output is controlled for either a ⅓ hp or an optional ½ hp relay. C-100 series Solar Systems Controllers are microprocessor-based differential temperature controls that combine temperature monitoring and system control. Temperatures are displayed on a three-digit LED display, and sensors are selected by a selector switch on the face plate of the controller.

Made in USA

Manufactured by:

Independent Energy Inc.

Box 860
42 Ladd Street
East Greenwich, RI
USA 82818

(401) 884-6990

Distributed by:

Contact manufacturer for local Canadian distributor.

Markko Differential Temperature Controller

Manufactured by:

Markko Construction

195 Kennedy Road South, Suite 309
Brampton, Ontario
L6W 3H2

(416) 453-4325

The Markko GW-15S Solar Controller provides automatic control of most active solar energy collection systems. The controller senses collector and storage temperatures and controls either the circulating pump, fan, solenoid valve, or other accessories. Positive-temperature coefficient silicon thermisters are used to provide temperature measurements. The turn-ON differential is adjustable through 4°C to 16°C, and the turn-OFF differential is fixed at 2°C. Mode operations include low-limit protection set at 3°C, and high-limit protection set at 77°C, both site-adjustable. Features include LED indicator lights and a manual control switch. CSA certified.

Made in Canada

Rho Sigma

The RS-504 Series Controllers provide ON-OFF control for the circulating pump. The circuit design is all solid-state, and standard models control 3 amps, 1/10 hp, 120 VAC. Standard differentials are 11°C ON and 1.6°C OFF. Control options include high-temperature limit, freeze protection for recirculating systems, freeze protection for drain down systems, and a proportional control system to vary the speed of the circulation pump in relation to the temperature difference between the storage tank and the collectors.

The RS-120 Series provides ON-OFF control using the same electronic components and sensors as the RS-504 Series. A relay controls the output to the pump. Standard models control 6 amps, 1/8 hp at 120 VAC. Standard differentials available are 11°C ON and 1.65°C OFF. Control options include a high-temperature limit of 71°C and freeze protection.

Made in USA

Manufactured by:
Rho Sigma Inc.

1800 West 4th Ave.
Hialeah, FL
USA 33010

(305) 885-1911

Distributed by:
E.S. Gallagher Sales

44 Eugene Street
Toronto, Ontario
M6B 3Z4

David Gallagher
(416) 789-5385

Solartech DB Controller

The Solartech DB Controller is a solid-state 2-temperature differential controller. The differentials are fixed at 8°C ON and 2°C OFF. A time delay is built in to eliminate cycling, and several system status lights are added for convenience. A manual override switch is included, and over-temperature protection is provided. The power input is 115 VAC, at 60 Hz and the controller output is rated at 1/8 hp, 125 watts at 120 VAC.

Made in Canada

Manufactured by:
Solartech Ltd.

39 Cranfield Road
Toronto, Ontario
M4B 3H6

David Wood
(416) 752-4990

Solarsystems Differential Controllers

Manufactured by:
Solarsystems Industries Ltd.

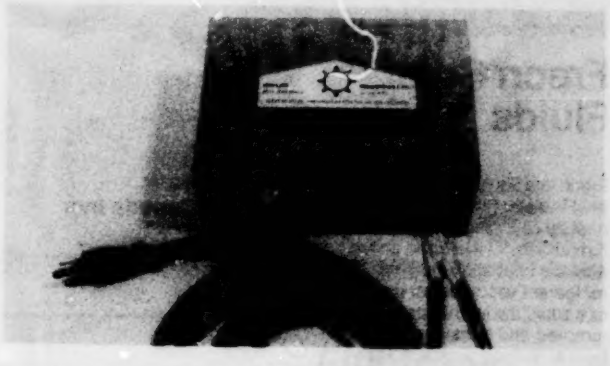
2-11771 Horseshoe Way
Richmond, British Columbia
V7A 4S5

Erich Hoffmann
(604) 271-2621

The Solarsystems DT-11 Differential Controller incorporates solid-state circuitry, thermister-type sensors, a relay output and LED lights to indicate when the system is ON. Power input is 120 VAC, contacts are rated at 3/4 hp maximum, 14 amps at 100 VAC. ON differential is adjustable between 5°C and 15°C, OFF between 0°C and 4°C.

The Solarsystems Sol-900 is an electronic, multipurpose, solid-state differential controller for space heating, DHW, and pool systems. The ON differential is adjustable between 5°C and 15°C and the OFF differential between 0°C and 4°C. LED lights indicate when the pump is on. Controller power output rating is 3/4 hp, 14 amps at 120 VAC. Control options include freeze protection for drain down valves, high temperature protection for drain back systems, and night-time cooling. The product is CSA approved.

Made in Canada



Sunspool Drain Down Valve

Manufactured by:
Sunspool Corp.

439 Tasso Street
Palo Alto, CA USA 94301

(415) 324-2022

Designed for drain down systems, this brass valve is fail-safe in the event of power failure by using a stainless steel spring. 2.0 watt standby power consumption and 12, 24, or 115 VAC operation. UL listed.

Made in USA

3.8 Heat Transfer Liquids

Dowfrost and Dowtherm

Dowfrost-LO and Dowfrost-NT are both inhibited propylene glycol antifreeze solutions and can be used at temperatures up to 149°C. Dowfrost-LO is a food-grade version and contains a corrosion inhibitor. Dowfrost-NT is essentially identical, but also contains an antifoaming agent and an additional inhibitor to avoid copper and brass corrosion. Quality of both fluids must be regularly monitored to ensure that inhibitor levels are maintained. The pH is in the 9 to 10 range.

The Dowtherm series of heat transfer liquids are based on ethylene glycol, and will operate over the range −40°C to 149°C. Inhibitors provide corrosion protection for common metals. Typical properties for a 50% aqueous solution are freezing point −37°C, boiling point 174°C, flash point and fire point both 121°C, density 1055kg/m^3, and specific heat 3515kJ/kg/°C.

Made in USA

Manufactured for:
Dow Chemical of Canada Ltd.
P.O. Box 1012
Sarnia, Ontario
N7T 7K7

Freon Solar Fluids

Freon is a liquid fluorocarbon heat transfer fluid, which transfers heat by changing phase. Evaporation of the liquid phase absorbs heat and when the refrigerant vapour is condensed to a liquid the latent heat is removed and transferred to the heat absorbing device. A variety of different Freon solutions is available. Freon is stable an non-corrosive, can be used without a pump, has no reverse flow, allows use of smaller pipe sizes, and is non-freezing.

Made in USA

Manufactured for:
DuPont Canada Inc.
789 Don Mills Road
Don Mills, Ontario
M3C 1T5
David Inglis
(416) 362-5261

Syltherm 444

Manufactured for:
Dow Corning Canada Ltd.
6747 Campobello Road
Mississauga, Ontario
L5N 2M1
Hazel Booth
(416) 826-9600

Syltherm 444 silicone heat transfer fluid has a working temperature range from −29°C to 177°C and can withstand intermittent exposure to stagnation temperatures as high as 232°C. It is non-freezing, non-boiling, non-corrosive, and virtually non-toxic. No drain down valve is needed.

Made in USA

Aquasol 60-NT

Manufactured by:
Magnus Chemicals Ltd.
190 Boulevard Industriel
Boucherville, Québec
J4B 2X3
(514) 655-1344

Aquasol 60-NT is a propylene glycol solution with inhibitors added to protect copper and steel components of solar heating systems. A non-toxic red dye is added for leak detection. It will protect against freezing to temperatures of −50°C, and can be diluted with water for use in milder climates. The specific heat of this fluid is 3485 J/KgK, no flash point, the boiling point is 109°C, and the specific gravity is 1.05.

Made in Canada

Therminol

Manufactured for:
Monsanto Canada Inc.
200 Argentia Road
Plaza II
P.O. Box 787, Streetsville Post Office
Mississauga, Ontario
L5M 2G4
(416) 826-9222

Therminol liquid phase heat transfer fluids operate over the temperature range of −51°C to 400°C, and can be used in non-pressurized systems. A variety of liquid phase heat transfer fluids is available, including Therminol 44, 55, 60, 66 and 88. Some typical properties: flash points 154°C—207°C; fire points 160°C—238°C; boiling point 290°C—420°C; specific heat 2.01 kJ/kg/°C; density 880 kg/m^3. A variety of vapour phase heat transfer fluids is also available.

Made in USA

3.9 Monitoring Devices

Amherst M-500 Data Acquisition System

The M-500 is a 64-channel, computer-controlled data acquisition system which plugs directly into off-the-shelf micro-computers and allows detailed examinations of energy flows. Software is provided which allows linearization of non-linear transducer characteristics to be as complicated as necessary. Temperatures can be measured within 0.1°C. The M-500 incorporates differential analog input, programmable high impedence instrumentation amplifiers, and dual-slope 12-bit A/D converter. Any transducer that has an output in either volts, amps, resistance, or frequency can be attached to the M-500.

Made in Canada

Manufactured by:

Amherst Renewable Energies Ltd.

1070 Morrison Drive
Ottawa, Ontario
K2H 8K7

(613) 820-3274

The Clorius Energy Meter

The Clorius Energy Meter for hot or chilled water systems allows measurement consumption in kilowatt hours. Magnetic flow metering is used. The difference in temperature between supply and return is integrated with the flow signal and the built-in computer calculates the thermal energy consumed. The electro mechanical readout displays total kilowatt hours and displays the time elapsed. Flows up to 45 litres per minute and temperature differences up to 100°C can be measured.

Made in Denmark

Manufactured for:

Dahl Brothers Canada Ltd.

Box 219, Clarkson Post Office
Mississauga, Ontario
L5J 3L1

(416) 822-2330

Solarmeter

Manufactured for:

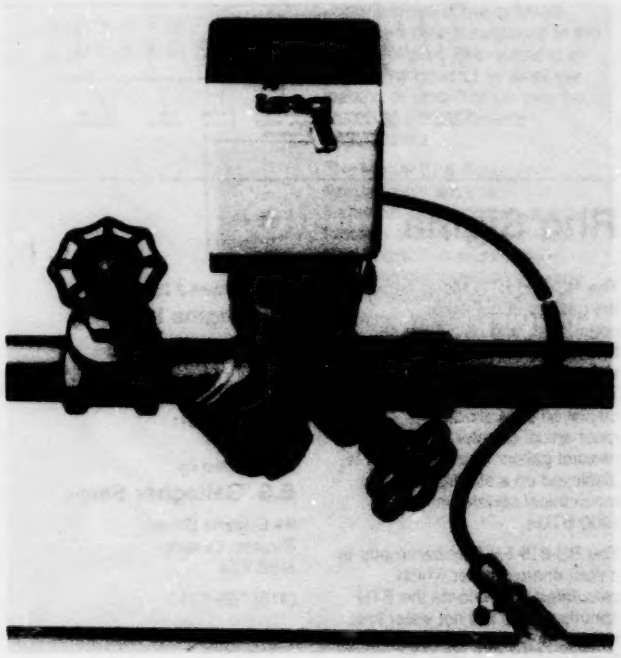
Con-Serve Group Ltd.

18 Gradwell Drive
Scarborough, Ontario
M1M 2M9

Tom Lanczi
(416) 266-9635

The Solarmeter measures the flow rate and temperature difference of a water system and provides a six-digit electro-mechanical readout in kilowatt-hours. Includes remote sensors and standard 25mm (1 inch) fittings for plumbing connection. The self-contained battery pack provides a 12-month operating life. The accuracy is within 1%.

Made in Europe



Electronic Thermometers

Manufactured by:

Heliotrope General

3733 Kenora Drive
Spring Valley, CA
USA 92077

Bob Hutalar
(714) 460-3930

Distributed by:

Contact manufacturer for local Canadian distributor.

Heliotrope General electronic thermometers are available with 3, 11, or 33-station capability. The typical temperature range is from 0°C to 180°C. A variety of sensors, a strip-chart recorder, and a digital hand-held unit with single-station capability are also available.

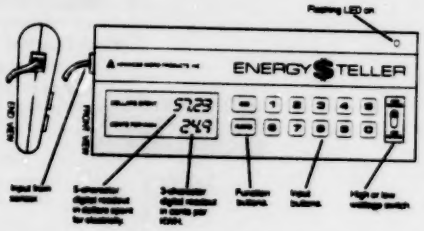
Made in USA

Energy Teller

Energy Teller is a cost-display meter which monitors the amount of energy being consumed by any 120-volt electrical appliance. The device plugs into a standard electrical outlet, the appropriate kilowatt-hour rate is entered, and the appliance is plugged into the meter. An LED display shows the amount of electrical energy being consumed in dollars and cents.

Made in USA

Manufactured by:
Advanced Micro Products, Inc.
150 N. Meramec, Suite 205
Clayton, MO
USA 63105
Tim Michels
(314) 725-5501



Rho Sigma

The RS-805 BTU Meter records the gallons of hot water consumed, and calculates the total BTUs delivered to the hot water load from the solar system. The volume of water consumed is displayed on a six-digit mechanical counter to the nearest gallon, and the energy is displayed on a six-digit mechanical counter in units of 1000 BTUs.

The RS-815-FP Comparameter is a dual energy meter which calculates and records the BTU contribution to the hot water load from solar energy sources and from fossil fuel sources. The results of the two energy calculations are displayed on two 6-digit counters in units of 1000 BTUs.

The RS-1008 Photovoltaic Pyranometer operates on the basis that the short circuit voltage output of the silicon cell is directly proportional to the radiant input. The RS-1008 is temperature-compensated and the sealed space under the glass dome is connected to a rechargeable dessicant reservoir to ensure dry-air conditions. The output is 100 mV at 315 W/m², and the accuracy is within 5%. A strip-chart recorder is also offered.

Made in USA

Manufactured by:
Rho Sigma Inc.
1800 West 4th Avenue
Hialeah, FL
USA 33010
(305) 885-1911

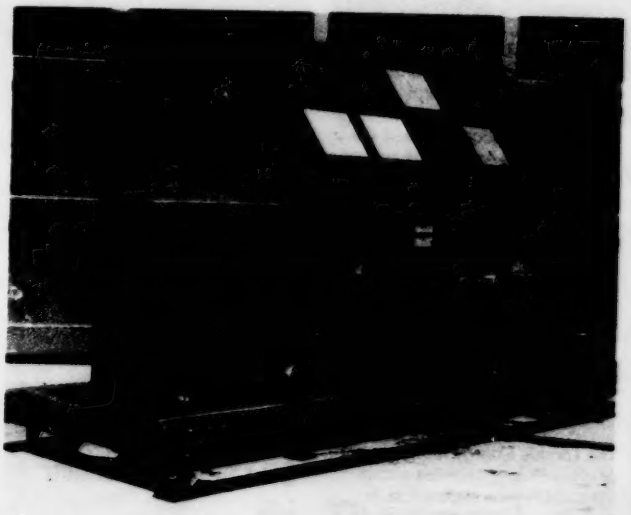
Distributed by:
E.S. Gallagher Sales
44 Eugene Street
Toronto, Ontario
M6B 3Z4
(416) 789-5385

MSTF-2 Mobile Solar Test Facility

The MSTF-2 Mobile Solar Test Facility is a wooden-framed educational tool for teaching and testing the essential functions of solar technology. The unit includes two Gemini collectors plus all the related components such as pumps, heat exchanger, tanks, and valves. Instrumentation includes a pyranometer, thermometer, differential controller, valves and switches.

Made in Canada

Manufactured by:
Solarfin Products
14 Victoria Avenue North
Hamilton, Ontario
L8L 5E1
(416) 522-4132



Multi Wavelength Sun Photometer

The Sonotek Model SPM1010 Sun Photometer is a portable, battery-pack instrument for measuring the intensity of solar radiation. A UV-enhanced silicon detector covers the span of near infrared, visible, and near ultraviolet light. Up to 4 narrow band filters mounted in a selector wheel may be used to achieve spectral sensitivity to specific wavelengths. The response is linear, and the instrument is calibrated against a standard reference source. The instrument is equipped with a standard tripod mount and may be coarse-aligned with the sun by means of sighting brackets.

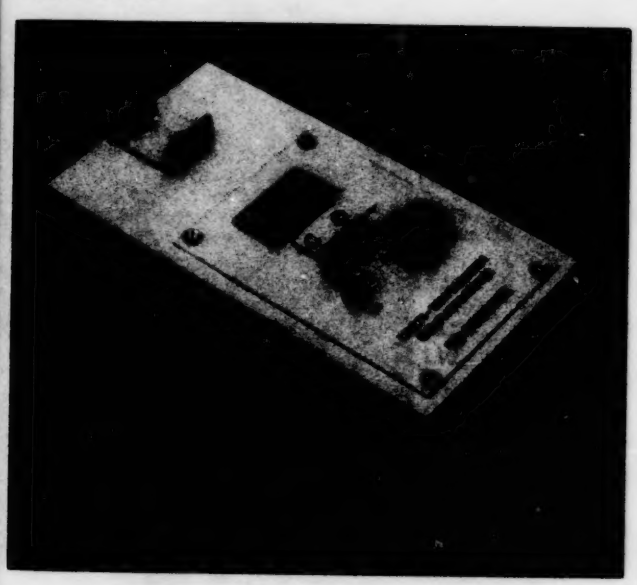
Made in Canada

Manufactured by:

Sonotek Ltd.

2410-5 Dunwin Drive
Mississauga, Ontario
L5L 1J9

(416) 828-6810



Radiation Detectors

The Eppley Pyranometer measures total sun and sky radiation. The detector is a differential thermopile with the hot junction receivers blackened and cold junction receivers whitened. The hemispherical envelope has a removeable weather-proof seal. The chromed black case carries a circular spirit level and adjustable levelling screws.

The TS-100 Photovoltaic Photosensor measures total sun and sky (global) radiation. The sensor is a solar cell mounted under a glass dome to obtain maximum cosine response to the sun's radiation. The output is in the mV range, and by selective loading or amplification may be scaled to the customer's requirements.

The Model 1016 Solar Accumulator records instantaneous radiation as a function of time onto a 31-day strip chart. The accumulated energy is displayed on a 5-digit electro-mechanical counter as CAL/cm^2, W/m^2, or BTU/ft^2. It can accept solar information from a variety of sensors.

Made in USA

Manufactured by:

Texas Electronics

Box 7225
5529 Redfield Street
Dallas, TX
USA 75209

(214) 631-2490

Distributed by:

Airflow Developments (Canada) Ltd.

1281 Matheson Blvd.
Mississauga, Ontario
L4W 1R1

(416) 624-2133

3.10 Phase-Change Materials

Thermol 81 Energy Rod

Thermol 81 Energy Rods are high-density polyethylene tubes filled with a compound which changes phase at 27°C (81°F). Each 89mm diameter cylinder stores 2600 kilojoules (2460 BTUs) of latent heat at 27°C. The rods are suitable for active water and air systems as well as for passive direct gain systems.

Made in USA

Manufactured by:

PSI Energy Systems Inc.

1533 Fen Park Drive
St. Louis, MO
USA 63026

Distributed by:

Energsave Systems Ltd.

Box 187
Oromocto, N.B.
E2V 2G5

David Libby
(506) 357-3397

ENER-G-TRAY

Manufactured by:

Saskatchewan Minerals

Box 120
Chaplin, Saskatchewan
S0H 0V0

John Williams
(306) 395-2561

The ENER-G-TRAY is a flat, self-stacking tray made of sealed, high-density polyethylene and filled with a mixture of Glauber's salt and other additives. There are two types of trays: F-9 and F-7. Both types contain 3.1 kg of mixture, weigh 3.5 kg, are 420mm long, 203mm wide and 46mm thick, and have a surface area of 0.20 square metres. The F-9 trays have a storage capacity of 525 kilojoules (500 BTUs) per tray with a melting point of 31°C. The F-7 trays have a storage capacity of 294 kilojoules (280)BTUs) with a melting point of 21°C. Both types of trays can be stacked up to 14 units high and are designed to allow for air flow between the layers. The container is currently being redesigned.

Made in Canada

Armstrong S-15

S.A. Armstrong Ltd. has been manufacturing pumps and heat exchangers in Canada since 1934. The new Armstrong S-15 is a magnetic-driven self-lubricating centrifugal pump with a five-speed selector to match system demand with pump speed. It is available with a cast-iron body for glycol closed loops or a bronze body for potable water in open loop systems, both with non-ferrous impellers. Maximum flow is 50 L/min (11 gal/min); maximum head is 5.2 metres (17 feet). Maximum fluid temperature is 82°C (180°F) at a maximum ambient temperature of 60°C (140°F); maximum working pressure is 620 kPa (90 psi).

Made in Canada

Manufactured by:
S.A. Armstrong Ltd.

1400 O'Connor Drive
Toronto, Ontario
M4B 2T9

K. Pearson
(416) 755-2291

Little Giant

Little Giant offers several in-line, magnetic-drive pumps suitable for solar applications. The CMD-100 series are fan-cooled, non-self-priming circulators with a bronze housing, Ryton impeller, and stainless steel shaft and magnetic separator. Service temperatures are up to 100°C (212°F) and line pressures up to 1034 kPa (150 psi). Maximum flow is up to 21.2 L/min (4.6 gal/min) with a maximum head of 3.7 metres (12 feet). Pumps are available with 115-volt sleeve-bearing motors or 230-volt ball-bearing motors. Other models are offered.

Made in USA

Manufactured by:
Little Giant Pump Co.

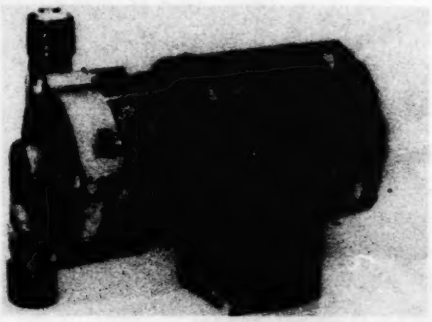
3810 N. Tulsa
Oklahoma City, OK
USA 73112

(405) 947-2511

Distributed by:
Ontor Ltd.

12 Leswyn Road
Toronto, Ontario
M6A 1K3

Phil Weiss
(416) 781-5286



Hartell

Hartell centrifugal pumps can be used in vented or closed loop solar systems. Service is up to 93°C (200°F) and 1034 kPa (150 psi) on continuous applications. Hartell pumps are self-lubricating and UL listed. GPPS-45H series are designed for drain back applications with a maximum head of 15.8 metres (52 feet) and a maximum flow of 47.3 L/min (10.4 gal/min). Other pumps are magnetic-driven and come in several flow and head ranges.

Made in USA

Manufactured by:
Hartell Division

Milton Roy Co.
70 Industrial Drive
Ivyland, PA
USA 18974

Douglas Bingler
(215) 322-0730

Distributed by:

Contact manufacturer for local Canadian distributor.

Grundfos

Grundfos makes a variety of circulators and booster pumps for solar applications. Grundfos Domestic Circulators are single-stage direct-drive, centrifugal pumps designed primarily either for open system water applications or for closed system applications. These pumps can be operated at system pressures of 979 kPa (142 psi) with fluid temperatures of 110°C (230°F).

The UPS 20-42 is a three-speed self-lubricating pump with a cast-iron housing and stainless steel impeller, shaft, and bearing plates, and with ceramic bearings, for use with either water or glycol solutions. Pumps for open systems feature stainless steel for all parts touched by water. Models are available for heads up to 6.3 metres (20.7 feet) and for maximum flows up to 108 L/min (28.6 gal/min). Multi-speed in-line booster pumps have a maximum flow of 1050 L/min (280 gal/min) or a maximum head of 15.8 metres (52 feet).

Made in USA

Manufactured by:
Grundfos Pumps Corp.

255 Clovis Avenue
Cloris, CA
USA 93612

(209) 299-9741

Distributed by:
Grundfos Pumps Division

Lenpar Corp.
415 Hood Road, Unit 21
Markham, Ontario
L3R 3W2

David Jagger
(416) 495-0697

March

March circulating pumps are sealless magnetic-drive units manufactured with a bronze or plastic housing, stainless steel shaft, and a Ryton plastic impeller. Models are available with capacities up to 83 L/min (18.3 gal/min) and heads to 9.1 metres (30 feet). Motors are fan-cooled with a maximum operating temperature of 250°C (500°F) and a maximum line pressure of 6895 kPa (1000 psi). The motor assembly can be replaced without draining the system.

Made in USA

Manufactured by:

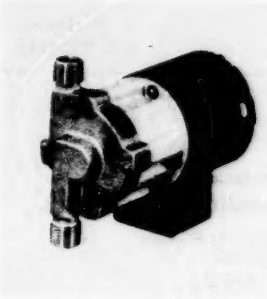
March Manufacturing Inc.

1819 Pickwick Avenue
Glenview, IL
USA 60025

Elsie Jones
(312) 729-5300

Distributed by:

Contact manufacturer for local Canadian distributor.



Myson L

The Myson L series direct-drive pumps are available with a bronze casing for open loop systems and with a cast-iron casing for closed loop installations. These compact self-lubricating pumps are self-purging and feature a variable output regulator. Heads to 4 metres (13.2 feet) and flow rates to 106 L/min (23.3 gal/min). Maximum system temperatures to 110°C (140°F) and maximum pressures to 1034 kPa (150 psi). UL listed and CSA approved.

Made in England

Manufactured by:

Myson International Ltd.

Faraday House
227 Gosbecks Road
Colchester
England C02 9L3

Available from:

Fleetwood Energy Products

15797 - 92nd Avenue
Surrey, British Columbia
V3R 1C4

Roy Hetherington
(604) 588-5877

Richdel R798

Manufactured by:

Richdel Inc.

1851 Oregon Street, Drawer A
Carson City, NV
USA 89701

Tom Erwin
(702) 882-6786

Distributed by:

Contact manufacturer for local Canadian distributor

The Richdel R798 solar centrifugal pump is manufactured with an integrally molded glass-reinforced plastic housing, a ceramic shaft seal, and a shrouded impeller. The maximum flow is 15 L/min (3.3 gal/min), with a maximum head of 5.1 metres (20 feet). The maximum continuous operating temperature is 93°C (200°F).

Made in USA

Taco

Available from:

Taco Canada Ltd.

3090 Lenworth Drive
Mississauga, Ontario
L4X 2G1

R.A. Sinclair
(416) 625-2160

Taco offers several pumps for use in either closed loop or open loop solar systems. The 007 and 008 Cartridge Circulators have a cast-iron housing, ceramic-coated stainless steel shaft, and water-lubricated carbon bearings; all moving parts are contained in a replaceable stainless steel cartridge. Other cartridge models are available with maximum heads to 11.4 metres (37.4 feet) and flow rates to 605 L/min (133 gal/min). The 102B is a compact, bronze-bodied, seal-type circulator designed for fresh-water solar applications. Maximum head is 2.9 metres (9.5 feet) and maximum flow rate is 37.8 L/min (8.3 gal/min). Most Taco pumps are UL listed and CSA approved. Pre-packaged solar control modules are also available.

Made in USA

3.12 Liquid-to-Liquid Heat Exchangers

Alfa-Laval

Alfa-Laval plate heat exchangers are made with various numbers of corrugated stainless steel plates gasketed and clamped together. These counter-current design heat exchangers are available in a variety of sizes and flow rates.

Assembled in Canada

Manufactured by:
Alfa-Laval Ltd.

113 Park Street South
Peterborough, Ontario
K9J 3R8

Hans Johannson
(705) 745-5735

Armstrong

Armstrong manufactures a Type W shell-and-tube heat exchanger consisting of a shell with inlet/outlet connections which carries one fluid, and a tube bundle also with inlet/outlet connections to carry another fluid. The tube walls form the heat transfer surface. Flow control valve, air control fittings, relief valve, and astro feed valve are available.

Armstrong WS heat exchangers are of shell-and-tube construction and are available in either 2 or 4 pass construction with U-beds expanded into a stationary tube sheet. A wide range of sizes are available from 100mm (4-inch) diameter to 500mm (20-inch) diameter and in various lengths up to 3.05m (10 feet).

Made in Canada

Manufactured by:
S.A. Armstrong Ltd.

1400 O'Connor Drive
Toronto, Ontario
M4B 2T9

K. Pearson
(416) 755-2291

Noranda "d-a" Heat Exchanger

The Noranda heat exchanger is a double-wall tube-in-tube heat exchanger with a special textured pattern on the inner and outer surfaces to increase surface area for better heat transfer. All joints are brazed. The all-copper heat exchanger is available with or without positive leak detection passages.

Made in USA

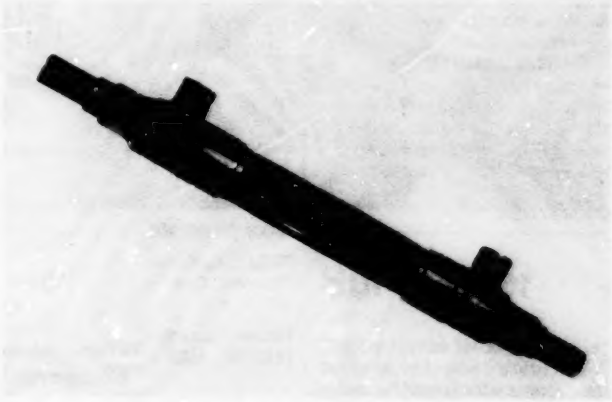
Manufactured by:
Noranda Metal Industries Inc.

Forge-Fin Division
Prospect Drive
Newtown, CT
USA 06470

Distributed by:
Amherst Renewable Energies Ltd.

Box 387
Perth, Ontario
K7H 3G1

(613) 267-6060



3.13 Passive Devices

Airfloor

Airfloor is a sheet-steel pan for forming air passageways in a poured concrete hollow floor through which solar-heated air is blown. The pan is a double-arched galvanized 26-gauge steel stamping, approximately 300mm square and 90mm high.

Made in USA

Manufactured by:

Aircontrol Systems Inc.

14625 Carmenita Road, Suite 220
Norwalk, CA
USA 90650

(213) 921-9493

Solarvent Automatic Greenhouse Window Opener

Solarvent is a heat-activated device which automatically opens greenhouse windows or vents or cold-frames when the temperature rises from 20°C to 24°C and closes them on a similar temperature drop. Lifting capacity is 4 kg, and up to 9 kg with an optional counterbalance.

Made in USA

Manufactured by:

Dalen Products, Inc.

201 Sherlake Drive
Knoxville, TN
USA 37922

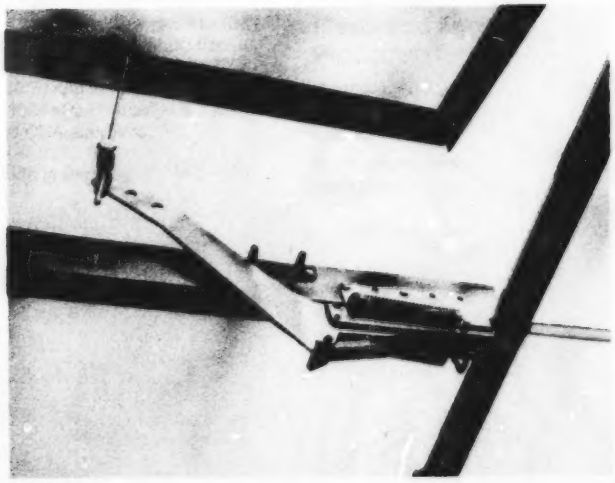
(615) 690-0050

Distributed by:

Prometheus Energy Components

7773 Yonge Street
Thornhill, Ontario
L3T 2C4

Rob McMonagle
(416) 881-3369



Heat Motor

Manufactured by:

Heat Motors, Inc.

Box 411
Fair Oaks, CA
USA 95628

Distributed by:

Kingston Solar Systems Ltd.

1085 Princess Street
Kingston, Ontario
K7L 1H3

Donald Sleeth
(613) 549-4040

Heat Motor is a thermally-activated device providing automatic venting. Its initial opening temperature is adjustable between 10°C and 32°C, making it suitable for use in greenhouses, solar collectors, shutters, skylights, vents and other applications requiring proportional control in response to rising and falling temperatures. For each 5.5°C rise in temperature, the Heat Motor will move a 23 kg load 25mm.

Made in USA

Temp-Vent

Temp-Vent is a low-cost safety vent made from aluminum bi-metallic strips and silicone gasketing, designed to withstand sunlight, typical collector operating temperatures, and frequent cycling. A Temp-Vent at the top and bottom of double-glazed collectors will create a thermosyphon air valve which allows a cooling air flow through the collector during stagnation conditions. It can be field-adjusted to open between 60°C and 82°C.

Made in USA

Manufactured by:

Solar Components Corp./Kalwall

Box 237
Manchester, NH
USA 03105

Distributed by:

The Sun Catchers

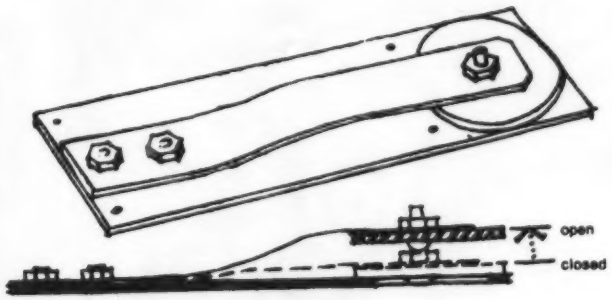
110 Garrioch Avenue
Winnipeg, Manitoba
R3J 2T3

(204) 889-6767

Energy Alternatives Ltd.

Box 671
Amherst, Nova Scotia
B4H 4B8

Stuart Lindsay
(902) 667-2790



Sorod Roof De-Icer

Manufactured by:

Tindev Inc.

RFD I
Box 325 B
Lincoln, MA
USA 01773

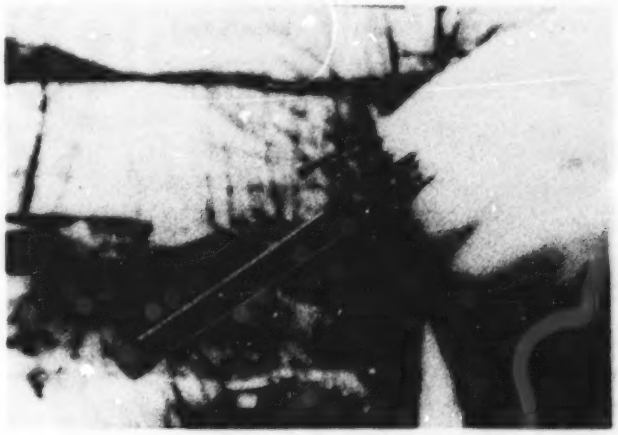
Distributed by:

Robert Neill Co.

Box 959
Sutton West, Ontario
L0E 1R0

The Sorod roof de-icer is a 1.2-metre long heat-pipe with a black aluminum-fin solar absorber covered with a 38mm diameter clear plastic cylinder on the outer end. The unit clamps to the shingles along the eaves; solar energy is transferred from the collector via a sealed refrigerant through an aluminum tube, which melts a small tunnel through an ice dam, allowing the water to drain.

Made in USA



Sunbender

Manufactured by:

Zomeworks

Box 712
Albuquerque, NM
USA 87013

(505) 242-5354

The Sunbender reflector-shade is designed to fit over a skylight to reflect additional solar energy into the house. Construction is mill-finish aluminum with a reflectivity of 70%. Adjustable struts allow the unit to be lowered in summer to shade the skylight but still allow some light to enter.

Made in USA

3.14 Solar Gadgets

Solarts Mini Solar Cells

These mini encapsulated solar cells produce 0.4 volts with outputs ranging from 50 to 700 milliamps. Matching DC motors, kits, and solar-powered toy models are also offered.

Made in USA

Manufactured by:

SES Inc.

2807 N. Propect
Colorado Springs, CO
USA 80907

Distributed by:

Sun Creations Ltd.

1066 Pembina Highway
Winnipeg, Manitoba
R3T 1ZB

(204) 475-8942

Photovoltaic Calculators

Manufactured for:

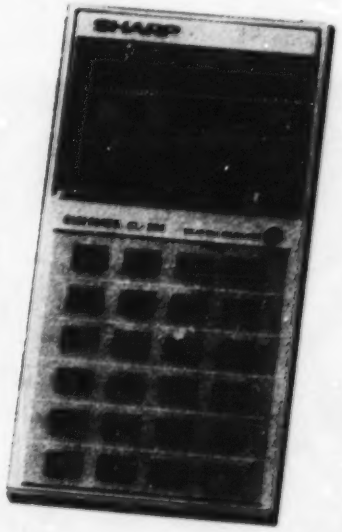
Sharp Electronics

116 Galaxy Blvd.
Rexdale, Ontario
M9W 4Y6

(416) 675-7244

Sharp manufactures six models of photovoltaic calculators which operate by sunlight, flashlight, or any other artificial light. No batteries are used. Types are hand-held, credit-card size, scientific, and one desk-top office machine, all operated by photovoltaic cells.

Made in Japan



4. Solar Design Aids

4.1 Computer Design Programs

AHL-80 and ACG-80

Two programs are available for the TI-59 programmable calculator with a PC-100 printer: a building heat loss program and an active liquid system design program.

Made in USA

Manufactured by:
Aardvark & Sun Solar Inc.
167 Webbers Path
West Yarmouth, MA
USA 02673
(617) 385-8932 or 394-6391

Solar Energy Programs

Beckman, Duffie and Associates provide three products to be used for solar energy system design. *Solar Energy Programs* is a book of 13 programmable calculator programs for the analysis of active and passive solar systems. The book is written by the originators of the F-CHART design method and is keyed to *Solar Engineering of Thermal Processes* by J.A. Duffie and W.A. Beckman (Wiley, 1980).

F-CHART PLUS for the Apple is an enhanced version of F-CHART 3.0 written in Apple BASIC. This interactive program allows analysis of direct gain, passive, collector storage closed loop systems, pool heating, industrial process heating, and includes an economic analysis section. Weather data is supplied for 244 North American stations (14 Canadian).

The F-LOAD program allows enhanced thermal and economic analysis of building energy requirements, based on ASHRAE recommendations, and active and passive solar energy systems. F-LOAD is available in BASIC or FORTRAN. Both programs are supplied with a manual.

Made in USA

Manufactured by:
Beckman, Duffie and Associates
P.O. Box 5562
Madison, WI
USA 53705

Energy Software

A variety of programs is available, together with users' manuals, under a licensing arrangement. Programs include PASODE-1, a passive solar design correlation program which calculates solar savings, economic, and energy values; BILL, which determines actual energy use by correlating actual energy records with local weather conditions; and INSULATE, OVERHANG, and LIFECOST.

Made in USA

Manufactured by:
Londe-Parker-Michels Inc.
150 N. Meramec Street
St. Louis, MO
USA 63105
Steve Andes
(314) 725-5501

S-Matrix Pre-Recorded Software

S-Matrix Enterprises has developed programs on magnetic cards for use with the TI-59 calculator. Over 30 programs are available covering economics, mechanical engineering, radiation, and both active and passive design including several different versions of F-CHART. The company is working on similar programs to run on home microcomputers.

Made in Canada

Manufactured by:
S-Matrix Enterprises Ltd.
516-675 West Hastings Street
Vancouver, British Columbia
V6B 1N2
(604) 669-4310

G-CHART and P-CHART

G-CHART is a ten-step procedure for calculating the annual performance of solar systems. No programmable calculators or computers are needed; an accuracy within 2% RMS is claimed when compared with F-CHART.

P-CHART determines the most cost-effective passive design by comparing different design elements and materials. Only a standard calculator is required. Accuracy is claimed within 1.5% RMS when compared with the SLR method developed at the Los Alamos Scientific Laboratory.

Made in USA

Manufactured by:
Solar Energy Design Corp. of America
400 Remington Street
P.O. Box 67
Fort Collins, CO
USA 80522

Software Brochures

SERI produces a number of publications of interest to solar designers, including *Analysis Methods for Photovoltaic Applications* and *Analysis Methods for Wind Energy Applications*. *Analysis Methods for Solar Heating and Cooling* contains brief descriptions of analysis methods and design tools, ranging from simple rules-of-thumb aimed at builders and designers to sophisticated computer simulation packages. *Microcomputer Methods for Solar Design and Analysis* is a source guide for available software packages to be used on a variety of computers.

Made in USA

Prepared by:
Solar Energy Research Institute (SERI)
1617 Cole Boulevard
Golden, CO
USA 80401
Design Tool Manager
(303) 231-1261

Passolar Program Library

Passolar is a program library for estimating the annual performance of passive solar buildings for use with the TI-59 calculator. The main program allows calculation of monthly and yearly solar saving fractions and auxiliary heating loads for various systems; auxiliary programs estimate the effect of different system design variables. A book, *Solar Energy Calculations*, by Roderick Graeff, is also available and covers making your own programs, buying programs, running programs, as well as descriptions of Solarcon programs.

Made in USA

Manufactured by:
Solarcon Inc.
607 Church Street
Ann Arbor, MI
USA 48104
(313) 769-6588

SEEC Design Library for Programmable Calculators

SEEC has developed a solar energy system design library for use on Texas Instruments and Hewlett-Packard programmable hand-held calculators. The programs allow the user to determine system performance and cost-effectiveness of passive, active, and hybrid residences. The sizing of system components can be accomplished with specific programs. Eight different programs are available, including F-CHART.

Made in USA

Manufactured by:
Solar Environmental Engineering Co. Ltd.
2524 Vine Drive E.
Fort Collins, CO
USA 80524
David Guenther
(303) 221-5166

Solar Energy Software

Nine different sets of program cards for HP-97 are available on F-CHART air and liquid system sizing, on radiation, and on collector performance.

Made in USA

Manufactured by:
Sunshine Power Co.
1018 Lancer Drive
San Jose, CA
USA 95129
(408) 446-2446

3D Solar Programs

Programs for the TI-59 programmable calculator allow performance prediction of active and passive solar space heating or hot water heating systems. Programs include F-CHART and the base temperature method. All programs are supplied with a manual, and a textbook, *Solar Thermal Engineering*, by P.J. Lunde (Wiley, 1980).

Made in USA

Manufactured by:

3D Solar Programs

% Peter J. Lunde
4 Daniel Lane
West Simbury, CT
USA 06092

(203) 658-0639

F-CHART and TRNSYS

F-CHART is a computer simulation program for active solar systems. Several versions of F-CHART are available. F-CHART 3.0 simulates liquid and air-based solar heating systems with varying collector parameters, heat exchanger, storage size, space and domestic hot water heating loads. An economic routine outputs various economic analysis results. F-CHART 4.0 is an extension of F-CHART 3.0. Certain solar systems components have been added, including concentrating collectors, high-temperature solar systems, heat pumps, and phase change storage. Additions have been made to the economic section as well. Fifty-nine subroutines are included; weather data for 244 North American locations (14 Canadian) are available.

TRNSYS is a program for simulating the dynamic thermal behavior of active solar heating and cooling systems where the user specifies the components which comprise the system and the manner in which they are connected. The program is written in FORTRAN. A users' service is also provided by the University of Wisconsin for those who do not want to learn the details of the program.

Made in USA

Manufactured by:

University of Wisconsin - Madison

Solar Energy Laboratory
1500 Johnson Drive
Madison, WI
USA 53706

TRNSYS Coordinator
(608) 263-1586

TEANET and PASCALC II

TEANET is a 7-node thermal network program developed to stimulate the performance of different types of passive buildings hourly for 24 hours. PASCALC II is a program used to predict the monthly and annual auxiliary heating energy requirements and solar fractions of passive solar buildings. PASCALC II ECONOMICS calculates the life-cycle expenses of various passive systems. Programs use the TI-59 calculator and PC-100 printer.

Made in USA

Manufactured by:

Total Environment Action Inc.

Church Hill
Harrisville, NH
USA 03450

(603) 827-3374

4.2 Computer Design Services

Consulting Services

This company provides a consulting service using several in-house computer simulations. Active and passive systems can be simulated using either hourly or monthly time steps. The active programs for liquid and air systems allow storage, water use pattern, heat exchanger, pumping rates, collector properties, collector size, and shading to be simulated using hourly weather data.

Available from:

Okins, Leipciger, Cuplinskas, Kaminker and Assoc. Ltd.

1 Valleybrook Drive
Don Mills, Ontario
M3B 2S7

E.L. Cuplinskas
(416) 445-8255

Computer Service

A number of solar energy computer programs are stored in Public Works Canada's account numbers in the Computer Service Bureau. Programs include F-CHART, SBLR, WATSUN-III, TRNSYS, SOLCOST, BLAST, and DOE-2. Two service bureaus have access to the Public Works programs, Control Data Canada Ltd. and Data Crown Inc. In addition, several programs are available on the Public Works Canada mini-computer in each of the PWC regional offices. The use of the PWC minicomputer is free of charge but subject to availability.

Documents are available from the Solar Programs Office for F-CHART 4.0, F-CHART 3.0, and SBLR. Weather data is available under this service for a number of Canadian cities.

Available from:

Solar Programs Office Public Works Canada

Sir Charles Tupper Building
Riverside Drive
Ottawa, Ontario
K1A 0M2

E. Mansour
(613) 998-3942

Computer Analysis

Available from:

Solar Canada

SOLDATA Computer Analysis Division
4776 Wyandotte Street E.
Windsor, Ontario
N8Y 1H7

(519) 945-6322

SOLDATA is a custom computer analysis of potential solar space heating and DHW applications in the form of a computer print-out month by month derived from information such as location and orientation of collectors, insolation levels, storage capacity, and economics.

WATSUN User Service

Available from:

Waterloo Research Institute

University of Waterloo
Waterloo, Ontario
N2L 3G1

Rodney Groves
(519) 885-1211 ext. 3040

The WATSUN User Service at the Waterloo Research Institute offers programs to aid in the study of technical and economic feasibility of solar-assisted DHW and space heating systems. Simulations based on hourly weather data can be carried out for different locations and building types and with such variables as collector area, storage volume, heat exchangers, and heat pumps. Output includes an economic analysis. A *User's Manual* and a *Program Documentation Manual* are available.

4.3 Solar Access Measurement

Shadow Mapper

Shading objects are observed through a sighting tube. Mechanical scales provide readings of latitude, azimuth, elevation angle, and solar time. Date, time, and duration of each shadow are recorded on a separate chart. Includes instruction manual, plotting charts, and foam-lined aluminum case.

Made in USA

Manufactured by:
Campbell Engineering
1302 Toney Drive S.E.
Huntsville, AL
USA 35802
(205) 539-1242

Solar Site Selector

Sighting through a distortion optic enables coincident viewing of shading objects and winter sunpaths. Observed shadow boundaries are traced on a clear plastic overlay over transparent sunpath grids. Summer shading is determined by extrapolation. Includes instruction manual and canvas case.

Made in USA

Manufactured by:
Lewis and Associates
105 Rockwood Drive
Grass Valley, CA
USA 95945
(916) 272-2077

Sun Angle Calculator

Shading objects and transparent sunpath grid are coincidently sighted in a plane mirror, horizontally mounted at the centre of the instrument. Successive sightings at various azimuth angles enable construction of a horizontal plot. Elevation-angle scale enables instrument to be used as a desk-top sun angle calculator.

Made in USA

Manufactured by:
Zomeworks
P.O. Box 712
Albuquerque, NM
USA 87103
(505) 242-5354

Solar Pathfinder

The Solar Pathfinder is a reflective device which enables observation of the full year's sunpaths, shading objects, and associated solar energy values in a single image. Supported on a tripod, a transparent bubble dome is mounted above a sun-path diagram, available for latitudes from 25°N to 49°N. A tracing of shadow boundaries produces a record of site-analysis data on sunrise to sunset shading information and energy values.

Made in USA

Manufactured by:
Solar Pathways Inc.
3710 Highway 82
Glenwood Springs, CO
USA 81601
(303) 945-6503

Distributed by:
Foresight
82 Loomis Street
Burlington, VT
USA 05401
Sharyl Green
(802) 863-2682

For rent by:
Solar Potential Analysis
914-475 Elgin Street
Ottawa, Ontario
K2P 2E6
(613) 232-9747

Appendix

Appendix

Regional Conservation and Renewable Energy Office Addresses

Conservation and Renewable
Energy Office
Box 65, Atlantic Place
215 Water Street, 7th Floor
St. John's, Newfoundland
A1C 6C9

Conservation and Renewable
Energy Office
Bank of Montreal Tower
5th Floor, Suite 503
5151 George Street
Halifax, Nova Scotia
B3J 1M5

Conservation and Renewable
Energy Office
Waterfront Shopping Centre
98 Water Street
Summerside, P.E.I.
C1N 4M1

Conservation and Renewable
Energy Office
835 Champlain Street
Dieppe, New Brunswick
E1A 1P6

Conservation and Renewable
Energy Office
605 Dorchester Blvd. West
Ground Floor
Montréal, Québec
H3B 1P4

Conservation and Renewable
Energy Office
2242 Lakeshore Blvd. West
Toronto, Ontario
M8V 1A5

Conservation and Renewable
Energy Office
Main Floor
112 Osborne Street South
Winnipeg, Manitoba
R3L 1Y5

Conservation and Renewable
Energy Office
S.J. Cohen Bldg., Suite 706
119 - 4th Avenue South
Saskatoon, Saskatchewan
S7K 5X2

Conservation and Renewable
Energy Office
Grandin Park Plaza
22 Sir Winston Churchill Avenue
2nd Floor, Room 200
St. Albert, Alberta
T8N 1B4

Conservation and Renewable
Energy Office
Marlborough Mall
5021 Kingsway
3rd Floor, Room 320
Burnaby, B.C.
V5H 2E5

Conservation and Renewable
Energy Office
2078 Second Avenue
Whitehorse, Yukon
Y1A 1B1

Conservation and Renewable
Energy Office
Precambrian Building
4922 – 52nd Street
Yellowknife, N.W.T.
X1A 2N1

Solar Heating Catalogue No. 4

Make Sure You Are Included

If you have a solar-related product or service that you think should be included in a future update of the ***Solar Heating Catalogue***, make sure you fill in the attached questionnaire form and return it to:

Canadian Solar Industries Association
67A Sparks Street
Ottawa, Ontario
K1P 5A5 (613) 237-7000

The ***Solar Heating Catalogue*** is divided into two sections for listings, the Directory and the Product Guide. Make sure you fill out the appropriate form.

1. Directory

The Directory lists basic information on manufacturing, service, and resource organizations in the Canadian solar industry. Condensed information is provided on the products, experience, or special services offered by these organizations.

2. Product Guide

The Product Guide gives a brief description of the product and provides basic information on model numbers and options. Products are listed by a simple hierarchy of headings: 1. Systems, 2. Components, 3. Parts and Materials, and 4. Design Aids.

Cross-references are given for products described in the ***Solar Product Data File***, a technical specifications publication of the Canadian Solar Industries Association.

Notes for Directory Entries

1. Type of Service

For each province, the Directory is subdivided by industry sector. Tick the appropriate heading under which your company should be listed. If your company is involved in more than one sector, identify a second heading under which your company should be cross-listed. Branch offices can be listed separately, providing they send in their own filled-in questionnaire.

2. Demonstrated Experience

Only companies or organizations with demonstrated experience in the solar field can be listed. To ensure that you are listed, a brief description of your major solar projects must be given, including such details as project name, location, type of system, collector area, and commissioning or completion date.

Notes for Product Guide Entries

3. Product Description

The product description must provide specific details on product size, performance, and specifications. Where available, test data should be submitted. As an example, a flat plate solar collector description should include information on the glazing material and manufacturer, absorber type and material, insulation type and manufacturer and collector container material. Product literature and supporting technical documentation or specifications should also be submitted.

4. Illustrations and Photographs

Entries in the Product Guide can be illustrated by a photograph or line drawing. For good reproduction, photographs should be large (8" × 10") black and white glossy prints. Illustrations should be a reasonable size and drawn with a strong black line; three-dimensional representations are preferred. Titles and labels for the drawings should be noted separately and will be typeset to allow for consistency of style.

5. Imported Products

To be included in the ***Solar Heating Catalogue***, products must be made in Canada with a minimum of 51% of direct costs originating in Canada. Imported products may be listed provided that they have already been used on Canadian projects and that they are available in Canada from a Canadian sales office. In certain cases, these restrictions can be waived for highly specialized products, provided that the manufacturer can supply proof that no comparable product is available within Canada.

Directory Questionnaire Form

Solar Heating Catalogue No. 4

1. Organization: _____

2. Address: _____

Postal Code: _____

3. Contact person: _____

4. Telephone: _____

5. Type of service: (see Note 1)

- ☐ Designers
- ☐ Distributors
- ☐ Information and Education
- ☐ Installers
- ☐ Manufacturers
- ☐ Research and Development
- ☐ Other _____

6. Description of service: _____

7. Qualifications: _____

8. Completed projects: (see Note 2) _____

Cut out and mail to:

Canadian Solar Industries Association Inc.
67A Sparks Street
Ottawa, Ontario K1P 5A5
(613) 237-7000

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- ☐ Distributors
- ☐ Information and Education
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- ☐ Manufacturers
- ☐ Research and Development
- ☐ Other _____

6. Description of service: _____

7. Qualifications: _____

8. Completed projects: (see Note 2) _____

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Ottawa, Ontario K1P 5A5
(613) 237-7000

Product Guide Questionnaire Form

Solar Heating Catalogue No. 4

1. Product Category: _____

2. Product name and model number(s): _____

3. Address:
   Manufacturer: _____
   Distributor: _____

4. Contact person: _____

5. Telephone: _____

6. Product description: (see Notes 3 and 4) _____

7. Options: _____

8. Canadian content: (see Note 5) ☐ Made in Canada

Cut out and mail to:

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Ottawa, Ontario K1P 5A5
(613) 237-7000

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